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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII — CLEVELAND, OHIO, JULY 21, 1904 — NUMBER 29.

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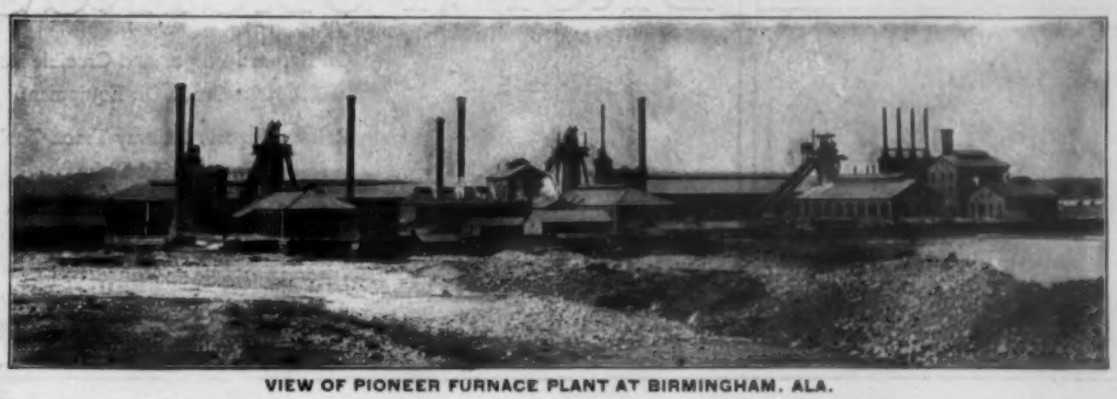

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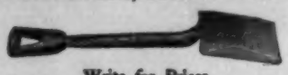

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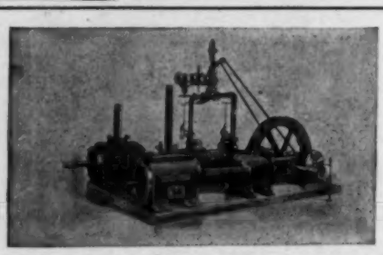

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, JULY 21, 1904 NUMBER 29.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The story of actual developments in the iron market week by week sounds tame at a time when interests outside the iron trade are celebrating in advance the return of good times. Sentiment is better, undoubtedly, and this better feeling has helped some sellers of pig iron to take a stand, so that it may turn out, for example, that $9 for Southern No. 2 foundry iron will not be seen again this year on ordinary lots. But there is a difference, not appreciated in some quarters, between a seller at bay, with back to the wall, refusing to do business at a loss, and the beginnings of a new movement bearing the label of genuine improvement.

The Pennsylvania tunnel contracts have been the chief feature of interest in the past week, since after months of negotiation, the castings for both tunnels and the pig iron for the castings are either covered by signed contract or on the eve of being placed. The Wheeling Mold & Foundry Co.'s is reported to be the only signed contract at this writing and its inquiry for 25,000 tons of iron is out. The Davies & Thomas Co., Catasauqua, Pa., has substantially closed for 54,000 tons of the East River castings. A large Central Western furnace interest is expected to receive this week a large share of the pig iron deliveries extending into 1907. This single contract may amount to as much as 125,000 tons. The prolonged deliveries make the entire tunnel business less significant than the tonnage would imply and some of the bids on pig iron indicate that a few furnaces, at least, do not expect high prices in the next two or three years.

The general pig iron situation has improved to the extent that leading Southern producers have put their prices a peg higher. Inquiries have been rather more numerous, but Southern furnaces cannot get any great amount of business for Central Western delivery at $9.25 or $9.50 at furnace as long as Northern furnaces in that territory are willing to sell at $11.75, and in some cases 25c lower, at furnace for No. 2 foundry. The firmer attitude of Southern furnaces may have been due in part to a 25,000-ton inquiry a leading merchant pig iron interest put out recently, and evidently as a signal that bottom was believed to be reached. What the market actually will do will be settled more by the course of Northern producers who this year have very cheap non-Bessemer ores. The Northern furnaces continue to have recourse to restriction of output and this movement will go further, according to present plans. Some business placed the past week brought out a price of $11.40 at Valley furnace for No. 2 foundry, or $12.25 Pittsburg, but today's market is 25 to 35 cents higher, making $11.75 at furnace the minimum. At this figure Southern furnaces could not compete in Northern Ohio and Western Pennsylvania at $9 Birmingham for No. 2. The Southern coal strike continues. The net decrease in coke output has been only about 1,200 tons a day. Virginia coke has been shipped in in considerable quantities, and curtailment has not gone beyond the Tennessee company's Bessemer and Oxmoor furnaces thus far. Chicago reports some good buying in both malleable and foundry irons, chiefly from large buyers who contract regularly for six months' supplies.

From a production at a rate of over 18,000,000 tons a year in March, April and May, coke and anthracite furnaces got down to a yearly rate of 15,700,000 tons in June. Furnaces blown out in the latter part of June and others added to the idle list or scheduled to go out in July will bring the make of this month down to 1,100,000 to 1,200,000 tons for coke and anthracite furnaces, or less than the total for February of this year. An accumulation of 75,000 tons of merchant stocks by coke furnaces in June shows that consumption was then behind production, even with the curtailment that had gone on in the preceding month. Consumption in July, August and September now promises to be the smallest in any quarter of the year.

The steel market has paid no attention to the reaffirmation of the billet basis at New York, and the official prices are cut from $2 to $3 a ton, while sliding scale buyers get the benefit of the low prices on pig iron, as low as $11.40 at furnace being reported on Bessemer iron, though $11.75 is now the usual quotation. In finished material structural steel gives best indications of improvement, which should be no surprise in view of the months of limited buying. A 2,700-ton power house contract was taken at New York and a good volume of construction work is being figured on. Rail orders are talked about in a way that would give the impression that a new buying movement is at hand, but these reports are to be taken with reserve, evidence appearing that they are part of the literary bureau campaign now being carried on in Wall Street. Among inquiries mentioned are three from Western roads aggregating 30,000 tons and one from an Eastern road for 20,000 tons. Bar iron has shown a better tone in the Chicago district and 1.35c in that market is now the general price. Car works business has created a better feeling, one order being for 3,000 tons.

Reports of mill resumptions have been given undue significance in the past week. Shut downs have been extensive and it is time that orders showed some accumulation, even under the light demand of mid-summer weeks.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, July 20.

Contracts for the iron to be used in the manufacture of the New York tunnel castings will probably be placed before the end of the week. The English contractors, S. Pearson & Co., Ltd., are asking for bids on about 125,000 tons of foundry iron, and the indications are that the entire tonnage will be awarded to a large producer in the Central West and that the iron will be shipped either from furnaces in the Valleys or Western New York. S. Pearson & Co., Ltd., have awarded the castings to the foundries on a conversion basis, and as the successful foundries are located in the East it was presumed that the iron would be shipped from a nearby furnace. None of the furnaces has been willing to accept the contract at ruling prices. The Wheeling Mold & Foundry Co., whose contract with the O'Rourke Engineering Co. for North river tunnel castings was finally closed last week is again in the market, and this time is asking for bids on 25,000 tons. The contract for the castings was let to this concern outright. The bids asked on the

125,000 tons of pig iron for the East river specify delivery extending over a period of three years, shipments to begin in August. Furnaces figuring on this iron are also asking for bids on coke to cover the entire contract, the coke inquiries ranging from 125,000 to 150,000 tons. While the tonnage is large, none of the coke operators is disposed to name present prices on this business, and the contract is expected to be placed at from 25 to 50 cents a ton above prices of today.

Inquiries for pig iron continue numerous, and while many consumers are merely feeling the market, a few are covering their third quarter requirements. As a result of this limited buying the market on foundry iron as well as forge is somewhat firmer, while merchant furnaces in the Valleys will not take Bessemer under $11.75, and others are holding out for $12. Several concerns, believing that the bottom has been reached, have been picking up all the odd lots of iron offered at low prices during the past ten days, and in several instances extremely low prices were named. These prices cannot be taken as a criterion of the ordinary market. On No. 2 foundry iron as low as $11.40 at the furnace was done while forge sold at $11. On Bessemer $11.40 was reached and on basic $11.15 at the furnace was the low point. It is impossible to secure iron at these prices today. A few producers are extremely optimistic on the outlook while others consider the present flurry a repetition of the bulges in the market during the past six months, after each of which new low records on iron for this year were established.

Mills that were shut down the first of this month are again resuming operation, and while prices in almost all lines continue low there seems to be sufficient tonnage to warrant the mills operating in a limited way. The Homestead steel works of the Carnegie Steel Co., with the exception of the 119-inch mill which is being rebuilt, are on double turn this week for the first time in many months. The Bessemer department of this plant has been off for over two weeks and resumed with the remainder of the departments. The Republic Iron & Steel Co. started its Bessemer plant in Youngstown and the Brown Bonnell and Valley plants at that place are again operating to a limited extent. An accumulation of orders of course caused the resumption of these plants, but the amount of finished material that is now being placed will not warrant their operation at the present rate for any extended period.

New business in steel rails has improved somewhat. The Carnegie Steel Co. received an order, according to report, for 20,000 tons for an Eastern road. Plates, structural material, bars and sheets continue quiet, while official prices on billets and sheet bars are a farce, with commissions to brokers ranging from $1.50 to $2 per ton, and rebates to consumers of the same amount on account of defective steel (before the material is rolled). Independent mills not bound by the agreement continue to shade prices and no consumer in the market for steel has any idea of paying association prices.

On Thursday a conference will be held between the officers of the Amalgamated Association and the American Sheet & Tin Plate Co. on the continuation of the tin plate rebate. The effort is to adjust the matter no later than July 22, the date set for the expiration of the present agreement. Nor will there be any break of the independent sheet mills from the Amalgamated Association, the Youngstown Iron Sheet & Tube Co., one of the leaders of this organization having signed the scale last week. Other independent sheet mills are already dropping into line. The conference with the tin house workers has extended over into this week, although the scale expired on July 15. They were asked to accept a reduction in wages on rebate plate, but according to report refused to entertain the proposition. No date has yet been set for holding another conference on the bar iron scale. The American Steel Hoop mills of the Carnegie Steel Co. continue idle and no attempt is being made to operate them. Nothing has yet been done to hold another conference with this company to adjust the scale differences.

Pig Iron.—Sales of pig iron during the past week aggregate fully 5,000 tons, although much of this iron consisted of odd lots picked up at very low prices. While several Valley furnaces were quoting $12.35 Pittsburg on No. 2 foundry last week, they are holding out for $12.50 at present and we note the sale of 500 tons at this figure. On forge iron $12 Pittsburg cannot be shaded and a sale of 1,000 tons was made for delivery through the third quarter at this price. On basic the market is not so strong, and while several furnaces will not sell below $12.50 Pittsburg little difficulty would be experienced in shading this price 25 to 35 cents a ton. A wide range of prices continues to be quoted on Bessemer. Some furnaces refuse to sell below $12.85, Pittsburg, while small lots have been resold as low as $12.50 and one odd lot went at $12.25. The range of prices is no doubt due to the varying costs of production among the furnacemen, the prices already quoted representing the low points reached and which no doubt represent a loss to the operators on present ore and coke prices, last year's ore prices not being taken into consideration. We revise quotations as follows:

Bessemer, Valley	$11 75 to 12 50
Bessemer, Pittsburg	12 60 to 12 85
No. 1 Foundry	12 75 to 13 00
No. 2 Foundry	12 35 to 12 60
Gray forge, Pittsburg	12 00 to 12 15
Chilled basic, Valley	11 40 to 11 50
Chilled basic, Pittsburg	12 25 to 12 35

Steel.—The tonnage of billets and sheet bars continues limited, and so far as can be learned few consumers are paying association prices. While mills outside of the association are shading prices openly, there are numerous reports of association mills selling at the agreed prices with commissions of from $1.50 to $2 per ton being named, while the amount of defective steel that is being rolled, judging from the reports of concessions agreed upon before the material goes through the mill seems to be very heavy at present. The agreed prices, which do not represent the market, are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O., 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are quoted at $28 to $28.50 Pittsburg.

Ferro-Manganese.—The market continues quiet and domestic ferro, 80 percent, is held at $41.50 to $42 per ton, delivered at buyer's mill to any point east of the Mississippi.

Muck Bar.—No sales are being made and quotations remain nominally at $24 to $24.50 for neutral bars.

Skelp.—There is little buying, although most of the mills are operating at their normal capacity owing to the strength of the pipe trade. Steel skelp, grooved and sheared, is held at 1.35c to 1.40c, while iron grooved is held at 1.40c to 1.45c and sheared at 1.45c to 1.50c.

Rails and Track Material.—The buying of standard section rails is reported improved and contracts for about 20,000 tons are said to have been taken by a local mill. Several contracts are also reported closed in the West. We continue the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots $32; light rails, 16 to 25 pounds, $22.50 to $23.50; 25 to 40 pounds, $20 to $21.50. Track material, spikes, 1.60c to 1.65c.

Plates.—The idle plate mills of the Carnegie Steel Co. at Homestead resumed operations in full this week, orders having accumulated during their idleness. This 119-inch mill is being rebuilt and will hereafter be known as the 84-inch department. Little new business is being placed. Quotations are unchanged as follows: Tank plates, ¼ inch thick and up to 100 inches in width 1.60c at mill Pittsburg; flange and boiler steel, 1.70c marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates, more than 10 inches, 5c

extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

Bars.—Both iron and steel bars continue quiet, although heavy buying in iron bars is looked for in the near future. While steel bars are being shaded in the West, no concessions are being named in this market. We make the following quotations: Bar iron, 1.25c to 1.30c Pittsburg for local delivery, while for Western shipments quotations are based on 1.25c to 1.35c Pittsburg. Hoops are held at 1.55c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size, not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Structural Material.—No large contracts have been closed during the week, and outside of the orders recently closed, the mills are securing little business. Quotations are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Efforts on the part of consumers to shade 2.10c on black sheets, one pass through cold rolls, have proved ineffective. Several independent manufacturers this week refused 2.05c on 28 gauge and later secured the business on the basis of 2.10c. The point has been reached where mills are no longer operating at a profit and rather than take business at lower prices, prefer to shut down their mills. We make the following quotations on black sheets, one pass, in carload lots: No. 8, 1.60c; No. 9, 1.65c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18-21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 27, 2.90c; No. 28, 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

Pipes and Tubes.—There is little shading on merchant pipe, as prices have reached a point where further concessions are practically impossible except at a loss. Most of the mills are on in full, and while the merchant pipe trade is seasonably light, the tonnage of line pipe on the books of the leading producer is large. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch	70	55	69	54
½ inch	73	63	72	62
¾ to 3 inches	78½	68½	77½	67½
3½ to 6 inches	77	67	76	66
7 to 12 inches	72½	57	71½	56
Extra strong plain ends, ⅛ to 8 inches	69	59	68	58
Double extra strong, ½ to 8 inches	60	50	56	46

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inch	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	68	55
6 to 13 inches	60	43

Wire and Wire Nails.—Prices continue to be shaded, and but little business is being offered. Wire and nail plants continue idle or are operating at a limited capacity. We make the following quotations: Wire nails, carload lots to jobbers f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to point of destination. Terms, 60 days less 2 percent off in 10 days.

Merchant Steel.—The market continues quiet in all lines, and concessions are offered on almost all business offered. Quotations on shafting are being firmly maintained, however. We quote as follows: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.55c to 1.60c; plow steel, 6 inches and under, 1.35c for Bessemer and open-hearth; plow slabs, ¾ inch and heavier, 1.60c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Old Material.—This continues to be a dealers' market, although a few consumers are taking advantage of the low prices to cover their requirements. Heavy melting stock is offered at $10.50 to $11, while low phosphorus melting stock can be had in small lots as low as $13 and $14, gross tons. Several local mills are holding their heavy melting stock at $12 to $12.50 and will not sell below these prices.

Coke.—Inquiries are in the market for a large tonnage of furnace coke for delivery during the next three years, to cover iron contracts for the New York tunnel castings. It is probable that this business will be placed before the end of the week. Low prices continue to rule on furnace coke, $1.35 being quoted by some producers for delivery during the third quarter, while for fourth quarter delivery $1.40 and $1.45 is asked. On foundry coke quotations range from $1.75 to $1.85. About 10,500 ovens continue idle, the curtailment of output having about reached its high point. During the week ending July 9 the production of the upper region amounted to only 141,451 tons and that of the lower region to 46,371 tons. This is a falling off of 125,000 tons over the high points reached in production in the past two years.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, July 19.

With the exception that in some departments a larger measure of activity is noted, the local situation is without indications of any material change. The labor conditions in the West and South have if anything accentuated the procrastination of consumers in the matter of buying their pig iron for the last half. While continuing to freely sound the market, the bulk of them are withholding their orders until the outlook is better from a labor and business standpoint. On the other hand, however, the improved crop reports and the general scarcity of iron in consumers' yards foretell an active buying movement, and sellers generally are holding firmly to their schedules. The market is apparently on the upturn, though it is a slow movement; and rather than take business at lower than prevailing prices manufacturers will consider further curtailment of their output. Transactions in pig iron in the past week have been active despite the adverse circumstances surrounding the market, and the bulk of the business closed has been taken at good prices. Bar iron continues in good demand, the sales including some of the large tonnages that were pending last week. This material is now held from 1.35c to 1.40c Chicago, the lower price being quoted only on good sized lots. Specifications for steel bars show no diminution and Western mills have a good business booked. The International Harvester Co. continues to shade the official prices on soft steel bars $2 a ton, though it is not booking a large tonnage. There is some cutting of prices on wire products by the leading producer where it is necessary to meet competition on desirable business. Billets are quiet, and structural steel is in a listless condition, the week's transactions being marked by few sales of either product. The demand for merchant pipe and boiler tubes has received little impetus from the recent reduction in prices, and both products are sharing in the seasonable dullness that prevails. Cast iron pipe is quotably lower this week, but conditions in that market are without material change. Trading in sheets is quiet, the only noteworthy movement being from jobbers' stocks. Rail mills report having booked a few orders for heavy and light rails, aggregating several thousand tons, and some new business has been closed in track supplies. Scrap is without life and prices are stationary. Nothing new has developed during

the week in the coke market. The demand is light and prices are unchanged.

Tentative inquiries are reported to have been made during the week by several Western roads for an aggregate of 30,000 tons of standard rails for delivery this year, 12,000 tons of which are wanted by the Chicago & Great Western, 10,000 tons by the Chicago & North Western and 8,000 tons by the Illinois Central. Mill officials are reticent in discussing the subject, although they admit having been sounded on rail business and intimate that the orders may be forthcoming in a short time.

Pig Iron.—Despite the statistics showing continued excess of production over consumption, this market has a strong undertone. While it cannot be said to have gained materially in strength in the past month, it has certainly held its own. Southern producers have pushed prices up 25 cents above the $9 level, and if the strike of the miners in Alabama and Tennessee continues it may advance another 25 cents before long. Some furnaces are already holding their product at this price, but such are booking little new business. The Southern market generallv is on the basis of $9.25 Birmingham for No. 2. However, the tendencv is upward and the prospect of further curtailment to adjust output to the diminishing demand gives added strength. Some $9 No. 2 iron is still to be had, though it is fast growing scarce. During the week past, there has been heavy buying of Northern foundry and malleable irons, one seller putting his tonnage sold at between 20,000 and 30,000 tons. The No. 2 iron was closed at from $13.25 to $13.50 Chicago, and the malleable iron at $13.50. No particular significance may be attached to these heavy sales, as the bulk of the buyers were concerns who buy every six months for their requirements in the ensuing half year. The Northern market is firmer than it has been for some time, there being no stocks on hand at the furnaces in this territory with the exception of at one stack in South Chicago. We have revised some of our prices, and quote as follows:

Lake Superior Charcoal	$14 50 to 15 00
Northern Coke Foundry No. 1	13 75 to 14 00
Northern Coke Foundry No. 2	13 25 to 13 50
Northern Coke Foundry No. 3	12 75 to 13 00
Northern Scotch Foundry	14 50 to 15 00
Ohio Strong Softeners No. 1	14 50 to 15 00
Ohio Strong Softeners No. 2	14 00 to 14 50
Southern Coke Foundry No. 1	13 40 to 13 65
Southern Coke Foundry No. 2	12 90 to 13 15
Southern Coke Foundry No. 3	12 65 to 12 90
Southern Coke Foundry No. 4	12 40 to 12 65
Southern No. 1 Soft	13 40 to 13 65
Southern No. 2 Soft	12 90 to 13 15
Southern Gray Forge	12 15 to 12 40
Southern Mottled	12 15 to 12 40
Southern Silverics (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	13 50 to 14 00
Alabama Basic	13 15 to 13 40

Billets.—No sales are reported in this market within the past week. We continue to quote association prices for Bessemer and open-hearth billets, 4x4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Billets, 3-⅞ inches and smaller, and sheet and tin bars, $25. Open hearth billets from store are $1.30 per 100 lbs.

Iron and Steel Bars.—With the shutting down of many of the rolling mills in the Central West pending the signing of the wage scale, bar iron has grown in strength. The minimum quotation for small lots is now 1.35c, and by some mills is held at 1.40c, and only on large tonnages can this price be bettered. Transactions in the past week have included some large sales, notably 3,000 tons to the Haskell & Barker Car Co. Some good sized inquiries have also come forward from the packing houses as well as from car builders. Specifications in steel bars keep up to ample proportions, and the consumption apparently is as heavy as it has been at any time this year. We quote as follows: Bar iron, 1.30c to 1.35c, base half extras; soft steel bars, 1.40c to 1.51½c, half extras; soft steel angles, less than 3 x 3, 1.61½c; hoops, 1.71½c. On lots from store, we quote: Iron bars, 1.75c base, full extras; steel bars, 1.70c to 1.80c base, half extras; hoops, 2c to 2.10c rates, full extras.

Sheets.—Jobbers are taking the bulk of the business being offered these days, they being the only people who can give fairly prompt deliveries. The demand, however, is not very heavy, the trade suffering from the unusually hot weather and seasonable dullness. Prices remain about the same, and we quote as follows: For one pass, cold rolled, blue annealed sheets, mill shipments, Chicago delivery: Nos. 8 and 10, 1.77½c to 1.79½c; Nos. 11 and 12, 1.79½c to 1.86½c; Nos. 13 and 14, 1.84½c to 1.91¼c; Nos. 15 and 16, 1.89½c to 2.01½c. On box annealed, one pass, cold rolled: Nos. 18-20, 2.06½ to 2.11½c; Nos. 22-24, 2.11½c to 2.16½c; Nos. 25-26, 2.16½c to 2.21½c; No. 27, 2.21½c to 2.26½c; No. 28, 2.31½c to 2.36½c; No. 29, 2.46½c to 2.51½c; No. 30, 2.56½c to 2.61½c. Store trade is brisk and a good volume of business has been booked by local jobbers within the week past. Prices have been reduced $2 a ton, and we now quote as follows: No. 10 and heavier, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; No. 18, 2.30c to 2.40c; No. 20, 2.30c to 2.40c; No. 22, 2.35c to 2.45c; No. 24, 2.40c to 2.50c; No. 26, 2.50c to 2.60c; No. 27, 2.60c to 2.70c; No. 28, 2.70c to 2.80c; No. 29, 2.85c to 2.95c. Galvanized sheets are quiet, and we quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipments from local store, 75, 10 and 5 to 80 percent.

Structural Steel.—Some small specifications have been received from local structural yards, but aside from these the market is without interest or change. We quote carload prices, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; beams, 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—A little new business has been closed during the week under review, but nothing large has come up. Jobbers report fairly brisk movement from warehouse stocks. Independent mills rolling narrow plates are still shading association prices. We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86¼c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch, 1.86½c; Nos. 7 and 8, 1.91½; No. 9, 2.10½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼-inch and heavier, 2c; 3-16, 2.10c; No. 8, 2.15c; No. 10, 2.15c; flange steel, 2.25c, all f. o. b. warehouse.

Rails and Track Supplies.—Some small tonnages keep coming forward each week from electrical and steam roads, on which prompt deliveries are asked. The current buying, however, is not of large proportions. Prices are without material change, and we quote heavy sections, mill shipments, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $23 to $25; track supplies, f. o. b. Joliet mill; angle bars, 1.35c to 1.45c; spikes, first quality, 1.65c to 1.75c; track bolts, 3½ x ¾, with square nuts, 2.20c to 2.30c per 100 lbs.; with hexagon nuts, 2.35c to 2.45c.

Merchant Pipe.—This trade is suffering from the midsummer dullness, and aside from a good volume of specifications, there is nothing of interest to report. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ to ⅜ inch	68.35	53.35	67.35	52.35
½ inch	71.35	61.35	70.35	60.35
¾ to 3 inches	76.85	66.85	75.85	65.85
3½ to 6 inches	75.35	65.35	74.35	64.35
7 to 12 inches	70.85	55.35	69.85	54.35

Boiler Tubes.—Business continues to be of fair proportions, though the demand is yet far from what it should be. We quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1¼ inch	46.35	41.35	52.35
1¼ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	{ Up to 4 inches.
58.35 41.35	{	50.85	6 to 13 inch

Merchant Steel.—A few small contracts for implement specialties have been placed during the week, but the market generally is without change. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 1.90c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.70c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Cast Iron Pipe.—Makers report that only the usual routine of small orders have been booked during the week under review. Some municipal contracts are still pending, including 500 tons for Vancouver, B. C., and 500 tons for Winnipeg, both of which are expected to be let within the coming week. Prices are 50 cents a ton lower than a week ago. We quote 4-inch water pipe, $25.50; 6-inch to 12-inch, $24.50; larger sizes, $24; gas pipe, $1 a ton higher.

Wire Products.—Business in wire products during the week has been light, which is attributed by sellers to the usual midsummer dullness. The leading producer is shading its prices $1 a ton on desirable orders of wire nails, smooth and barbed wire, fencing, etc., though it has not changed its official schedule. The following prices, however, are generally being made. We quote on carload lots to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carloads, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads and $2.35 in lesser amounts; painted barb wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barb wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—The coke market, generally speaking, is weak in the matter of prices and quiet in demand. Standard 72-hour Connellsville grades are being held at prices ranging from $1.75 to $2 at the ovens, making the price at Chicago $4.40 to $4.65. Standard Southern grades are also held at about the same quotations.

Old Material.—The scrap market is never very active in the midsummer months, and the condition this summer is no exception to the rule. Demand has been quiet during the week under review, and prices are practically stationary. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$14 50 to 15 00
Old steel rails (4 feet and over)	11 00 to 11 50
Old steel rails (less than 4 feet)	10 00 to 10 50
Relaying rails, subject to inspection	22 50 to 23 00
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 50 to 12 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 00 to 7 50

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	12 00 to 13 00
No. 1 R. R. wrought	10 50 to 11 00
No. 2 R. R. wrought	9 50 to 10 00
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	8 00 to 8 50
Wrought pipe and flues	7 50 to 8 00
No. 1 cast, 150 lb. and less	9 25 to 10 00
Heavy cast	7 75 to 8 25
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	7 50 to 8 00
Boiler punchings	9 00 to 9 50
Iron car axles	15 00 to 15 50
Steel car axles	13 50 to 14 00
Iron axle turnings	7 00 to 7 50
Steel axle turnings	7 00 to 7 50
Cast borings	3 00 to 3 50
Mixed borings, etc.	3 00 to 3 50
Wrought turnings	6 00 to 6 50
Machine shop turnings	6 00 to 6 50
Railroad malleable	8 25 to 8 75
Agricultural malleable	7 75 to 8 00
Stove plate and light cast scrap	7 25 to 7 75
Old iron splice bars	12 00 to 12 50

The Milwaukee Coke & Gas Co.'s Chicago sales office, formerly located at 1103 Fisher building, has been removed to 221 North Branch street (off North Halsted), where the company's yard is located.

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, July 20.

Iron Ore.—There is no activity in the market for Bessemer grades, which are still quoted at $3.25 for old range and $3 for Mesabi, though these figures have been shaded slightly. The market in non-Bessemer is also quiet, but some business is being done at $2.50 to $2.70 for old range and $2.25 to $2.40 on Mesabis.

The Pittsburg Steamship Co. has contracted for considerable tonnage for the season on the basis of 70 cents from the head of the lakes, 60 from Marquette and 50 from Escanaba. The exact amount is not announced, but it was less than 2,000,000 tons. Although ore is moving freely, there are more vessels than cargoes.

Pig Iron.—Inquiries for pig iron to meet the requirements of contractors for the Pennsylvania railroad tunnels have been a prominent feature in the market. These inquiries are for deliveries carrying such a long period that furnaces are, as a rule, reluctant to make bids, but some have done so. No contracts have yet been made, but it is probable that at least a part of the tonnage will be provided for within a few days. Inquiries for Bessemer have developed but a limited amount of iron available for early shipment, showing that production and consumption have been very nearly the same. Sellers are holding for $11.75. No. 2 Northern foundry is also held at not less than $11.75 at the furnace and a few sales have been made at $12. Whenever there is an order in sight, there are many sellers ready to take the business, but local buyers have not been able to beat down quotations materially. The market has shown considerable strength in face of keen competition. In the South, prices have been advanced 25 cents and $9.25 Birmingham for No. 2 is now the usual minimum, while some companies are quoting $9.50. On the whole, while actual sales have not been much more numerous, the market is firmer. We quote as follows for Cleveland delivery:

Bessemer	$12 60 to 12 75
No. 1 Strong Foundry	12 75 to 13 00
No. 2 Strong Foundry	12 60 to 12 85
No. 3 Foundry	12 25 to 12 50
No. 2 Southern	13 10 to 13 35
Gray Forge	12 15 to 12 25
Gray Forge, Southern	12 00 to 12 15
Lake Superior charcoal	14 25 to 14 50

Finished Material.—Jobbers report an improvement in orders from stock for nearly all kinds of finished material. There has been little change in mill sales. Competition is very active and is especially strong in light rails in which both large and small producers are making concessions freely. The Cleveland rolling mills have not resumed and no definite date has been set for doing so, but it is certain that they will remain idle until August 1. There is very little demand for bar iron and the quotation 1.35c Pittsburg, or 1.44½c Cleveland, which has been nominal for some time, has been changed to 1.30c Pittsburg, or 1.39½c Cleveland, and this price is shaded on desirable business. The demand for steel bars at 1.44½c Cleveland for Bessemer, and 1.49½c for open-hearth, is somewhat improved and specifications against contracts are coming in satisfactorily. There is also some improvement in structural material, but not as much as reports of new construction would lead one to expect. The effect of the rapid increase in the use of concrete is being shown in decrease of use of steel. In competition, 2.10c for No. 28 black sheets can be done on orders of fair size, but on small sales the announced quotations are pretty well maintained. These quotations are about as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.74½c; No. 11-12, 1.79½c; No. 14, 1.84½c; No. 16, 1.94½c; No. 27, 2.19½c; No. 28, 2.29½c. Galvanized, mill sales, No. 14, 2.29½c; No. 16, 2.39½c; No. 18-20, 2.54½c; No. 22-24, 2.69½c; No. 25-26, 2.89½c; No. 27, 3.09½c; No. 28, 3.29½c. Black sheets out of stock: ¼ in., 1.90c; 3-16 in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25c. One pass cold rolled: Nos. 18-20, 2.35c; No. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Old Material.—Dealers are showing their belief that prices have struck bottom by buying in considerable quantities, but consumers are not yet ready to place orders. We quote as follows:

Old iron rails	$14 00 to 15 00
Old steel rails (over 6 feet)	12 00 to 13 00
Old steel rails (under 6 feet)	11 00 to 12 00
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	9 00 to 10 00
Malleable iron (agricultural)	8 00 to 9 00
Heavy steel	9 00 to 10 00

We quote the following net tons:

No. 1 R. R. wrought	$10 00 to 11 00
No. 1 busheling	8 50 to 9 00
No. 1 machine cast	9 50 to 10 50
Iron axles	15 00 to 16 00
Axle turnings	7 00 to 8 00
Wrought turnings (free from cast)	6 00 to 6 50
Grate bars	7 00 to 8 00
Pipes and flues	8 00 to 8 50
Tank iron	7 50 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	6 00 to 6 50
Stove plate	7 00 to 7 25
Steel axles	13 00 to 14 00
Cast borings	3 50 to 4 00

CINCINNATI.

July 19.

The coke market continues quiet and Connellsville district foundry cokes are quoted as low as $1.75, but for the best known makes $2 is still the asking price.

Pig Iron.—There has been more activity in the market the past week than for some time. Sales of a number of small lots ranging from 100 up to 500 tons have been made, and the aggregate of these orders foots up to several thousand tons. There has also been more inquiry and taking all together a stronger tone prevails. The buying has been sufficient to take about all the $9 iron off the market, and has strengthened the views of some of the $9 sellers. A careful inquiry in the trade fails to disclose any Southern furnaces now selling or quoting below $9.25 for No. 2 foundry Birmingham. This applies, of course, to the general list of Southern furnaces regarded as factors in the market. While it is not claimed that a buying movement has started, or that a continued increase in buying is to be expected, the business of the week has been such as to give conditions a more active appearance when compared with the recent dullness. It is argued that Southern furnace interests perceive that a $9 market could be sustained and concluded that $9.25 could be just as readily obtained in the limited territory now available to them for placing their irons. Northern furnaces have made low enough prices to prohibit the sale of the Southern product in Central and Northern Ohio and in Pittsburg territory. The fact that Southern iron has sold at $9.25 basis will have the effect of stimulating firm holding for the present at least. Some buyers who have been following the market closely, have expressed a willingness to place orders now at $9, but do not seem to be successful in finding any iron for sale at that price. Several local consumers have been buyers within the week, and one foundry interest placed a rather good sized order for pig iron on the basis of having secured a contract for castings from one of the largest machine tool builders here. The leading interest in cast iron pipe continues to take all of the lower grades of iron that are offered at attractive figures. No. 4 foundry and gray forge are held firm at quotations. We quote in carload lots f. o. b. Cincinnati:

Southern Foundry No. 1	$12 50 to 12 75
Southern Foundry No. 2	12 00 to 12 25
Southern Foundry No. 3	11 50 to 12 00
Southern Foundry No. 4	11 00 to 11 25
Southern Foundry No. 1 soft	12 50 to 12 75
Southern Foundry No. 2 soft	12 00 to 12 25
Gray Forge	11 00 to 11 25
Northern Foundry No. 1	13 65 to 13 90
Northern Foundry No. 2	13 15 to 13 40
Southern car wheel iron	16 25 to 16 50

Finished Material.—There has been no improvement in prices, but the market is more active and jobbers report an increase in tonnage. Buyers are still ordering in conservative quantities and show no disposition to cover beyond current needs, but the demand this week would indicate a better consumption. Bar iron is still quoted at 1.35c, f. o. b., with the possibility of a less price being obtainable on any attractive business. Steel bars are 1.48c, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.16c; No. 10, 2.05c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe, independent mills are underselling the recent cut of the leading interest and the market is quiet. Quotations for boiler tubes are omitted, as dealers are only naming prices upon inquiry and specifications.

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	68.7	53.7	67.7	52.7
½ inch	71.7	61.7	70.7	60.7
¾ to 3 inch, inclusive	77.2	67.2	76.2	66.2
3½ to 6 inch, inclusive	75.7	65.7	74.7	64.7
7 to 12 inch, inclusive	71.2	55.7	70.2	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
to 13 inch	54.2	36.7

Old Material.—Dealers report no improvement in buying, and state that it is still a dealers' market. Offerings are ample, and requirements exceedingly light. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	12 50 to 13 00
Old steel rails, gross tons	9 50 to 10 00
Old short lengths, gross tons	10 00 to 10 50
Old iron axles, net tons	13 50 to 14 00
Stove plate, net tons	6 00 to 6 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	3 00 to 3 50

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., July 19.

Pig Iron.—The past week was chiefly notable for a stiffening in prices of Southern irons, one of the leading interests having advanced the prices of old grades 25 cents per ton yesterday. This company now asks $9.50 Birmingham for No. 2 foundry for delivery in the remainder of the year, providing the buyer contracts for a round lot and will take shipments at intervals, otherwise delivery will not extend beyond the third quarter. There are still some companies booking orders at $9.25, but the aggregate tonnage is not large. Nothing is heard now about $9 iron, and Southern makers are confident that this figure will not be reached again this year. The strength of Southern irons is largely due to the disappearance from the market of those companies which have been offering their product for months at concessions, and who have little or no iron to sell now. The situation in Northern irons is unsatisfactory, much being heard of furnacemen curtailing production rather than take orders at prevailing prices, which are weak and irregular. A fairly good tonnage has been placed in Northern and Southern irons during the week. Several inquiries for round lots are in the market and likely to be closed any day, and melters are said to be using considerable more iron this month than they did in June.

The contractors for the Pennsylvania castings say that the documents remain unsigned, and they refuse, therefore, to give out any details. It is well understood, however, that the Davies & Thomas Co., of Catasauqua, Pa., will get the contract for 54,000 tons. While a Buffalo interest is said to be the likeliest bidder on the majority of the second 54,000 tons, it is said, on the other hand, that none of the business is going to Buffalo. New York pig iron quotations at tidewater follow: Northern No. 1 X foundry, $14.75 to $15; No. 2 X, $14.25 to $14.50; No. 2 plain, $13.75 to $14; Southern No. 1 foundry, $13.25 to $13.50; No. 2 foundry, $12.50 to $13; No. 3 foundry, $12 to $12.50; No. 4 foundry, $11.50 to $12.

Finished Iron and Steel.—There was an increase in orders for structural shapes during the week, the most notable one taken being by the American Bridge Co. for 2,700 tons for a power house on Kent avenue, Brooklyn. Small orders

booked amounted to a good tonnage in the aggregate. The plate situation is a little better than it has been, but there is room for much improvement. In sheets and bar iron there is much dissatisfaction with existing conditions, business being slow, and with little hope being held out for improvement in the near future. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84¼c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron and soft steel bars, 1.49½c; sheets, in carload lots, New York, No. 28, black, 2.35c to 2.40c; galvanized, 3.40c to 3.45c.

Old Material.—The market continues a listless one, transactions being meager. Offerings are heavy, but only when bargain prices are made does a sale result. Everybody is talking higher prices for August and September. As has been the case for weeks past, heavy steel scrap fit for charging and old steel rails, seem to be the bright features of the situation, with prices in each inclined to stiffen. Holders ask the followng prices per gross ton:

Old iron rails	$14 00 to 14 50
Old steel rails, long lengths	11 75 to 12 50
Old steel rails, short pieces	10 00 to 10 50
Relaying rails	16 00 to 17 00
Old car wheels	11 50 to 12 50
Old iron car axles	15 50 to 16 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	10 50 to 11 00
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 50 to 11 00
Wrought pipe	7 75 to 8 25
Ordinary light iron	4 50 to 5 25
Cast borings	3 50 to 4 00
Wrought turnings	5 50 to 6 00
No. 1 machinery cast	9 00 to 10 00
Stove plate	7 50 to 8 25

BIRMINGHAM, ALA.

BIRMINGHAM, Ala., July 18.—The pig iron market shows some little improvement this week, there being a fairly good inquiry for the product. Some of the companies in this district are selling more iron than they are making. There is no improvement in the local mining situation. The furnace companies are successfully providing for their needs in coal and coke, either shipping from merchant mines in this State or sending to Virginia. The Tenessee Coal, Iron & Railroad Co. has made preparations to use convicts in some of the mines in its Pratt division. It is understood that the Tenessee company has purchased a number of coal cutting machines and these will be operated by convicts. The company has also given notice to idle miners in the Blue Creek region, in the southern part of Jefferson county, that they must vacate the company houses Aug. 1. None of the other furnace companies is making efforts in this direction.

Iron production in this section has not been curtailed any more than was reported last week. The Tenessee company has four furnaces banked at Bessemer which can be started up at any time, while the Woodward Iron Co. has two furnaces banked in view of repairs. The company's coal mines are in operation under a temporary contract. Pig iron shipments are about equal to the production. The Sloss-Sheffield Steel & Iron Co. reports selling more iron than it has been making for several weeks, but stocks on hand are not being reduced as quickly as might be desired.

Pig iron quotations have stiffened some and No. 2 foundry is being held for $9.50 right along. The lowest price now accepted for that grade in quantity is $9.25, reports having it, though, that very little iron is being sold at that price. The following prices are given: No. 1 foundry, $9.50 to $10; No. 2 foundry, $9.25 to $9.50; No. 3 foundry, $8.75 to $9; No. 4 foundry, $8.25 to $8.50; gray forge, $8 to $8.25; No. 1 soft, $9.50 to $10; No. 2 soft, $9.25 to $9.50.

There is good activity among machine shops and foundries. The Birmingham Machine & Foundry Co. is still working on its Cuban sugar machinery order and has in hand a rush order for four Webb patented cotton compresses, weighing 105 tons each. The Hardie-Tynes and other shops have some healthy orders in hand also and a good number of men is being given employment in these industries. The Empire Plow Co., manufacturing steel plows at Ensley, has commenced work on an addition to the woodworking department, doubling its size.

An effort was made to operate the bar mill department of the Bessemer mills (Tennessee company) as an "open shop," but what success was attained cannot be learned. No efforts are being made to operate the iron mills hereabouts until the coal mining situation clears up.

Rumors prevail that the properties of one of the smaller iron companies of the Birmingham district had been offered, either by sale or consolidation to one of the larger companies. The latter declined the offer on account of the properties in question being so widely scattered about the State.

PHILADELPHIA.

July 19.

The advances in the stock market, the feeling that the presidential election will not involve issues of vital importance to the business world and the belief that crops will be large have been much talked of within a few days as evidence that conditions in iron and steel will improve, but there is not any solid foundation for such a prophesy at this time. The statistics showing that production of pig iron is still in excess of consumption furnish one of the hard facts which do not harmonize with some of the very optimistic predictions which are heard on the street.

Pig Iron.—Business is very quiet. While it is not admitted by sellers that prices are lower, there are evidences of weakness which indicate that quotations might be changed if an opportunity were presented to make sales of good size. Inquiries have been more numerous, but they do not result in orders. Southern iron is somewhat firmer. We quote as follows for Philadelphia and nearby deliveries: No. 1 X foundry, $15.25 to $15.50; No. 2 X foundry, $14.25 to $14.75; No. 2 plain, $13.75 to $14; Alabama No. 2 rail shipment, $13.50 to $13.75; Alabama No. 2 on dock, $12.75 to $13.25; standard gray forge, $13.25 to $13.50; ordinary gray forge, $12.75 to $13; basic, $13 to $13.25.

Finished Material.—Some mills have resumed this week, but their orders are very limited and it is uncertain whether they will continue in operation. Bars are very dull and the demand for other material is not much better. Some orders for plates and structural material have been placed with guarantee of prices. We quote: Beams, channels and angles, 1.73½c to 1.85c, according to the specifications, and small angles, 1.50c to 1.55c. Bars, both iron and steel, 1.48½c to 1.55c; skelp, 1.45c to 1.50c, sellers' mill for grooved and a tenth more for sheared.

Old Material.—Buyers are showing a little more interest, but business is very light and prices show no change. We quote: No. 1 steel scrap, $11 to $11.50; low phosphorus scrap, $15 to $16; old steel axles, $15 to $16; old iron axles, $16 to $17; old iron rails, $14.50 to $15; old car wheels, $11 to $11.50; choice railroad No. 1 wrought, $12.50 to $13; machinery cast, $11 to $12; No. 2 light scrap (forge), $9.50 to $10; No. 2 light scrap (ordinary), $8 to $8.50; axle turnings, $9 to $9.50; wrought turnings, $8 to $8.50; cast borings, $6 to $6.50; stove plate, $8.75 to $9.25; wrought iron pipe, $9.50 to $10.25.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., July 19.

Pig Tin.—During the week the market receded from the strong position it recently attained, and both transactions and prices have fallen off. In trade circles gossip is that business will be slow during the next month or so, and buyers, therefore, are only providing for their current wants. The London market for the past week has been active, and prices have advanced appreciably. Closing prices today follow: Spot and July, 26.15c to 26.37½c; August, 26.00c to 26.25c. London's closings today follow: Spot, £119 13s 9d; futures, £120 3s 9d. Arrivals for the month to date aggregate 1,893 tons, with 2,069 tons afloat.

Copper.—Only a fair business is reported, with a better demand for electrolytic than other grades. Prices remain unchanged, but there is no doubt that they would be lower

but for the export buying, which still continues heavy. The London market is a trifle higher, with a normal trade being done. Closing prices today follow: Lake, 12⅝c to 12⅞c; electrolytic, 12⅝c to 12¾c; casting, 12⅜c to 12½c. London's closings today follow: Spot, £57 13s 9d; futures, £57 12s 6d. Exports for the month to date aggregate 8,298 tons.

Lead.—Spot is strong and in good demand at 4.30 to 4.35c. St. Louis slightly weaker at 4.12½c to 4.15c. London unchanged at £22 2s 6d.

Spelter.—Is still quoted at 4.85c to 4.95c but business is slow. St. Louis is a trifle stronger at 4.77½c. London is stronger at £22 2s 6d.

Antimony.—Cookson's is 7.25c asked. Hallett's is 7.00c to 7.25c. Other brands are quoted at 6.00c to 6.25c.

Quicksilver.—We quote $42.50 per flask of 76½ pounds in lots of 100 flasks. London is £7 17s 6d.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, July 19.

The demand for metals has improved during the week under review and prices on several products have advanced. The general market is firmer, and the outlook much brighter than it has been for weeks. We have revised our prices and quote lake copper 13c for carloads and 13¼c for less than carload lots; casting, 12¾c for carloads and 13c for smaller quantities. Pig tin is firm at 27½c to 28c, according to quantity. Spelter is higher and is now selling 5c to 5¼c in carload lots. Sheet zinc has also advanced to 6c for carload lots of 600-lb. casks, and 6.20c to 6.25c for less than carload lots. Pig lead is unchanged at 4.20c for 50-ton lots and 4.25c for carload lots, and 4.35c for less than carload lots.

Old metals are lifeless and prices stationary. We quote: Copper wire and heavy, 10¼c; copper bottoms, 9¼c; copper clips, 10c; red brass, 9¼c; red brass borings, 7¼c; yellow brass, heavy, 7c; yellow brass borings, 6c; light brass, 5c; tea lead 3¼c; zinc, 3.40c.

New England Foundrymen's Association.

The July meeting of the New England Foundrymen's Association was held in the way of an outing at the Point Shirley Club, Winthrop, Mass. It was voted that all business be dispensed with. The president reported the death of Mr. A. J. Miller Sr., of Providence, R. I. A committee on resolutions consisting of H. A. Carpenter, J. O. Henshaw and Theodore Colvin, was appointed.

Announcement was made that the August meeting would be held at Providence and arrangements for it will be made by the Providence members, Mr. H. A. Carpenter acting as chairman. The meeting closed with 56 present.

Status of Furnaces Using Lake Ores.

J. G. Butler Jr., Youngstown, O., reports that out of a total of 178 blast furnaces using Lake Superior ores, 107 were in operation on July 1, the idle capacity amounting to only 35 percent. Since these figures were compiled a number of stacks have been blown out, however, in this district.

The plant of the Southern Car & Foundry Co. at Binghamton, near Memphis, Tenn., has been sold to the American Car & Foundry Co. The receivers are taking active steps in winding up the affairs of the company. The plant at Lenoir City has been sold to the Lenoir Car & Foundry Co. and the one at Anniston, Ala. has been returned to the former owner; the Illinois Car & Equipment Co. The sale of the Memphis plant leaves only the plant at Gadsden, Ala. on the receiver's hands.

The Roberts Machine Co., East Palestine, O., has opened an office in the Schmidt building, Pittsburg, for the sale of its stationary and portable gas engines, ranging from 4 to 40 horsepower. A neat folder has recently been sent to the trade calling attention to the Ohio Gas Engine manufactured by this company fully illustrated, giving detail measurements of the gas, gasoline and distillate engines.

MILL TABLE CONTROLLER TESTS.

The Electric Controller & Supply Co., Cleveland, has recently perfected a mill table controller which promises to be a very important addition to modern improvements in the application of electricity to mill operation. Orders have already been placed for this controller by the Lackawanna Steel Co., the Illinois Steel Co. and the Lorain Steel Co. In order to give electrical engineers connected with steel plants an opportunity to observe tests of the controller and to make suggestions of possible improvements, a number were invited to visit the plant of the Electric Controller & Supply Co. on Tuesday of this week. The controller was subjected to the severest tests, the special object being to show that it would stand rough usage of mill service, and the results were eminently satisfactory. Some interesting tests of planer controllers were also made to the satisfaction of the guests.

The visitors were entertained at luncheon Tuesday noon at the office building of the host and in the evening at a dinner at the Century Club. A theater party concluded the social functions of the day.

The following were present: E. B. Clark, assistant superintendent Illinois Steel Co.; Geo. Sturgiss, chief electrician, Lackawanna Steel Co., Buffalo, N. Y.; Frank Townsend, electrician, Lorain Steel Co., Lorain, O.; A. G. McKee, engineer, American Steel & Wire Co.; Roy Shover, electrical engineer, Ohio Steel Co., Youngstown, O.; Eugene Friedlaender, electrical engineer, Carnegie Steel Co., Duquesne, Pa.; S. S. Wales, electrical engineer, Carnegie Steel Co., Homestead, Pa.

The Wellman-Seaver-Morgan Co., Cleveland, was represented by T. R. Morgan, vice president and manager of works; Chas. Comstock, purchasing agent; G. H. Hulett, vice president; A. D. Hatfield, treasurer and secretary; and S. H. Pitkin, vice president. The representatives of the Electric Controller & Supply Co. were: Arthur Eastwood, engineer; W. W. Adams, secretary; Harold McGeorge, general manager; R. I. Wright, assistant engineer; J. H. Hall, chief draftsman; Frank Jessop, assistant in sales department; J. Motz, electrical engineer in charge of testing; and J. S. McKee, manager Pittsburg office.

Better Business in Rolling Mill Machinery.

Inquiries for rolling mill machinery are more numerous than they have been for some time, considerable equipment for foreign shipment being figured on. Mitsui & Co. and Okura & Co., New York, are asking for bids on a plate mill and equipment for a Japanese concern, while Takota & Co. and Mitsui & Co., of New York, are in the market for machinery for a tube plant to be erected in Japan. Thysser & Co., Germany, are making additions to their tube mills and are buying American machinery and equipment. The Scott Car Co., Knoxville, Tenn., will add 10 and 16-inch merchant mills to its plant. C. W. Whitney, of Cambridge, Mass., is asking for prices on a universal mill for foreign shipment. Houghton & Richards, of Boston, Mass., are asking for quotations on a 10-inch mill, also for foreign shipment. The Pacific Hardware & Steel Co., Portland, Ore., will install 12 and 16-inch merchant mills. Wickes Bros. & Co., Pittsburg, have placed an order for a 12-inch mill for one of their clients. John A. Roebling's Sons Co., Trenton, N. J., is about to begin the construction of a new rod mill. None of the large steel companies are buying additional equipment at present and no great amount of new business is looked for until there is a substantial revival in the iron and steel trade.

Stockholders of the Seger Coal & Coke Co., Pittsburg, at a meeting of the board of directors last week changed the firm name to the Colonial Coal & Coke Co. The company recently secured control of the Glen Easton Co. and this property, together with the Seger property, will be operated under the name adopted. Samuel Garrison is president; W. E. McMillan, vice president; John Seger, treasurer; A. H. Schewe, secretary; and W. G. Cronkright, general manager.

The Petroleum Iron Co., Washington, Pa., has purchased 17 acres of land at Arden station, near Washington. It is probable that the company's plant will be removed to the new site. The company is capitalized at $150,000.

BLOOM HANDLING EQUIPMENT.

The accompanying cuts represent a very effective combination of equipment built by the Wellman-Seaver-Morgan Co., Cleveland, for the Eastern Steel Co., Pottsville, Pa., this equipment consisting of an electric transfer table of special design, and an electric bloom charging machine, both of which have proven very successful in actual operation.

The arrangement of the plant is such that the mill tables run at right angles to furnace openings, and therefore the bloom, before it can be delivered to the mill table, must be turned at right angles to the position in which it is received

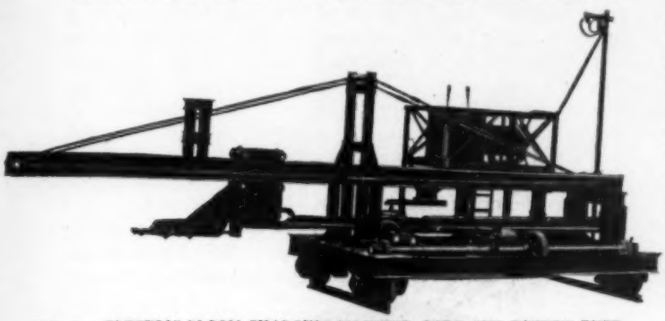


FIG. 1.—ELECTRIC BLOOM CHARGING MACHINE, BERG AND DINKEY TYPE.

from the furnace. Hence the necessity for the special transfer table. In front of the furnaces are the tracks on which the transfer table and bloom charging machine travel; the bloom charging machine being located on the tracks farthest from the furnaces and the transfer table on the tracks between the bloom charging machine and the furnace. The charging machine, in addition to pushing the bloom into the furnace for heating, is also used to withdraw it when heated.

The tongs of the charging machine are arranged to travel in and out of the furnaces as desired, gripping the heated bloom and drawing it out and delivering it on the transfer table. The transfer table is provided with three motors, one for propelling the transfer table longitudinally on the tracks, one for rotating the turn table with which the transfer table is equipped; and one for driving the rolls of the turn table. The transfer table, after receiving the bloom from the furnace, is propelled to the mill table, the turn table being given a quarter turn, bringing the bloom in line for feeding on the mill table, and the driving rolls of the turn table set in motion, delivering the bloom on the mill table in proper position for feeding through the train of rolls. Both the transfer car and charging machine are under the control of a single operator, who is accessibly located in the cab of the charging machine in full view of the work.

Building operations in twenty-three of the principal cities of the country for June show a notable increase as compared with the corresponding month a year ago. During the month just closed, according to official reports to the "Construction News," permits were taken out in these cities for the construction of 8,021 buildings, involving a total cost of $37,630,048, against 6,412 buildings, aggregating $26,585,226 in cost, during the same month a year ago. This is an increase of 1,609 buildings, and $11,044,822 in cost, or 42 percent.

John M. Leonard, controlling owner in the Mount Hope Iron Works Co., of Somerset, Mass., is authority for the statement that the works are to be closed permanently Aug. 1. About two hundred hands, earning $8,000 weekly, are employed in the manufacture of 100,000 kegs of cut nails annually. The cause assigned is the death of Henry B. Leonard, John Leonard's son, and the unwillingness of the latter to take up the burden of the business. Plans had been made for the construction of two open-hearth steel furnaces, but they will be abandoned. The sale of the works or reorganization are remote possibilities.

The property of the Model Gas Engine Co., Auburn, Ind., has been sold to John W. White, president of the White National Bank of Fort Wayne, Ind., for $47,500

TRADE PUBLICATIONS.

The Chester B. Albree Iron Works, Allegheny, Pa., in its catalogue No. 6, presents the latest forms of the Pittsburg riveting machines, with all the improvements suggested by operators of many machines in the United States and other countries. The tables on riveting and rivets have been revised, some of the company's customers having given valuable information.

O. S. Walker & Co., Worcester, Mas., make a specialty of magnetic chucks, which they have been putting on the market for the past five years with gratifying results. Their catalogue F is devoted to magnetic chucks and surface grinders. In addition to their large line of flat chucks, eight sizes of rotary chucks are built. All of these chucks are elaborately illustrated in the new catalogue.

The Kelly Foundry & Machine Co., Goshen, Ind., has been enjoying a very satisfactory export trade and has issued a catalogue in Spanish, which is probably the first catalogue on galvanized steel tanks issued in a foreign language by an American manufacturer. This company is making a special effort to give to foreign buyers information which they can easily understand. This company's catalogue No. 14 has been supplemented by a recent publication relating to the steel tank and implement department.

The Falcon Bronze Co., Youngstown, O., has issued a catalogue describing some of its products, in the way of bearings, acid proof castings, etc. This company has made a specialty of acid proof bronze castings for pickling crates and similar uses. The particular alloy which it uses is named Falcon acid metal and the company produces a very large variety of work from it.

Fairbanks, Morse & Co., manufacturers of steam and power pumping machinery, have, during the past year, completed and equipped an entirely new plant at Beloit, Wis., and now have greatly increased and improved facilities for manufacturing pumps. The firm has issued a new catalogue describing pumps now manufactured and also giving directions for setting up and running pumps and making repairs, etc. A feature of the catalogue is useful information and formulae for capacities in connection with pumps. A telegraph code for the use of customers is also given.

Dean Bros. Steam Pump Works, Indianapolis, Ind., have issued a pamphlet describing their vertical double acting pump and jet condenser and other pumps which they manufacture.

The Grinding Machinery Co., Chicago, having observed the rapidity with which grinding is coming more and more into general practice for all kinds of finishing, considered the line of grinding machinery broad enough to concentrate into a business of itself. The company has, therefore, opened a store where the grinding room can be fitted out complete. The company carries a large stock of emery wheels and grind-

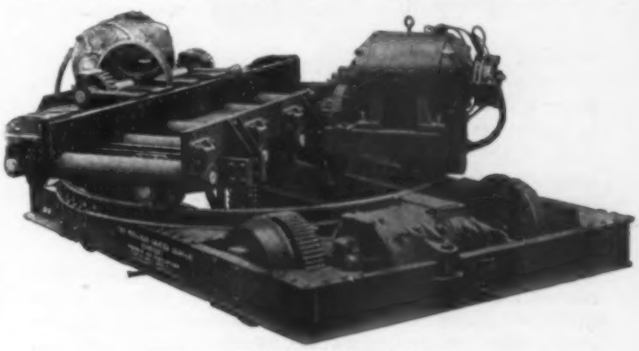


FIG. 2.—ELECTRIC TRANSFER TABLE.

ing machinery, which are described in the catalogue just issued.

The C. W. Hunt Co., West New Brighton, Staten Island, N. Y., devotes a new pamphlet to the "Stevedore" plumbago Manila rope. The company manufactures a special rope made from the strongest quality of selected Manila fibre, laid up with a tallow and plumbago lubricant, having the twist of the threads and strands carefully adjusted to the class of work to be done. This company has also issued a neat little catalogue, elaborately illustrated, descriptive of industrial railways as they are equipped by the company.

WORTHINGTON TURBINE PUMPS.

From the crude low-lift machines of the early days of centrifugal pumps the Worthington company has developed a high-lift centrifugal of scientific design which has entered fields previously occupied by displacement pumps exclusively. Fifty feet head was once considered the maximum for efficient operation, but 2,000 feet is now practicable and the efficiency has reached a par with that of displacement pumps. The low-head pump has also been improved along with the high-head pump.

The problem of the centrifugal pump designer is to so proportion the parts of his pump that it will pick up the water from rest, or from, perhaps, a velocity of 10 feet per second, bring it to the high velocity required by the head pumped against and then allow it to come to rest again in such manner that during the whole operation there shall be as little internal or other friction or loss by leakage or slippage as possible. Success depends upon the form and proportions of the passages through which the water enters the impeller chamber, the shape of the impeller vanes and the design of the chamber into which the water is delivered from the vanes. The early centrifugal pumps were made with straight, flat vanes, which discharged into a chamber of more or less conventional form. The result was excessive internal friction. All velocity consumed by friction and eddy currents in the water is so much lost work and is not effective in producing hydraulic head. The great improvements which have been made in the characteristics of centrifugal pumps have followed from careful, scientific design in proportioning severally the various parts of the pump chamber, the impeller and the diffusion vanes between the periphery of the impeller and the case.

Heretofore, the efficiency curves of centrifugal pumps have reached maximum values at points which the builders, in the endeavor to adapt one design to all services, seem to have been unable to control. However, by specialized design, this maximum point can be made to occur at any desired head, by modifying the internal proportions of the pump without in any way changing the general mechanical features.

The Worthington centrifugal pumps are divided into three classes: conoidal, volute and turbine. The conoidal centrifugals are designed specially for low lifts and large deliveries and are adapted to irrigation work, the handling of sewage and similar purposes. They are comparatively inexpensive and operate at high rotative speeds, making possible direct connection to electric motors. They are adapted to heads up to 30 feet. The volute centrifugals are built for medium lifts, but for all capacities. Since they run at moderate speeds, diffusion vanes are not needed, but the volute casing has been designed to obtain high efficiency and 86 percent has been shown under test. These pumps are designed for heads up to 70 feet, although they will withstand 150 feet. The turbine pump is suited to very high lifts, even exceeding 2,000 feet.

The Worthington turbine pump has been developed by a long series of experiments. The diffusion vanes, which form the distinguishing feature, take the place of the usual whirlpool chamber and assist in bringing the water to rest without internal commotion or shock. They correspond in function to the guide vanes of turbine water-wheels. One of the difficulties presented by high-lift centrifugal pumps has been the great peripheral speed required when only a single impeller is employed. This has been overcome in the Worthington multi-stage turbine pump by mounting a number of discs or impellers, each operating in a separate chamber, upon a single shaft and passing the water through the impeller chambers in succession. The lift can thus be multiplied three, four or five times, while the number of revolutions is kept within such bounds that it is possible to connect the pump directly to a steam engine or an electric motor. It has been demonstrated by experiment that on the same work and within reasonable limits, multi-stage centrifugals are more efficient than single-stage pumps, the increased efficiency being due to a decrease in the frictional losses coincident with the reduced peripheral speed of the impeller.

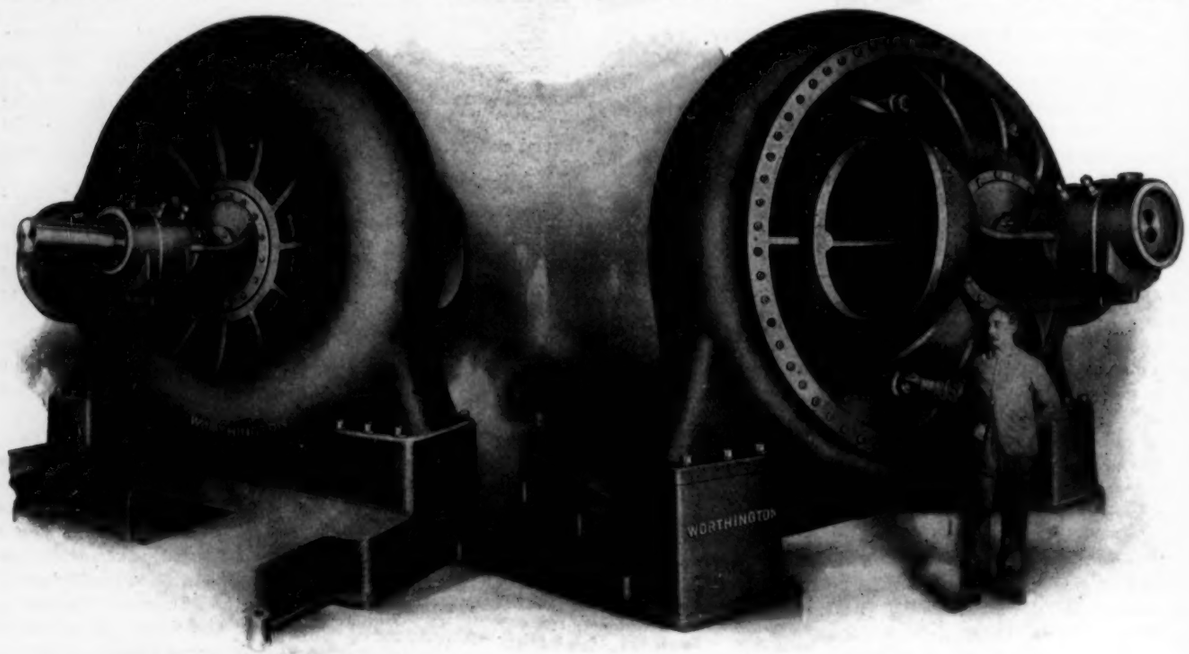


FIG. 1.—36-INCH TURBINE PUMP. CAPACITY, 35,000 GALLONS PER MINUTE AGAINST 160 FEET HEAD.

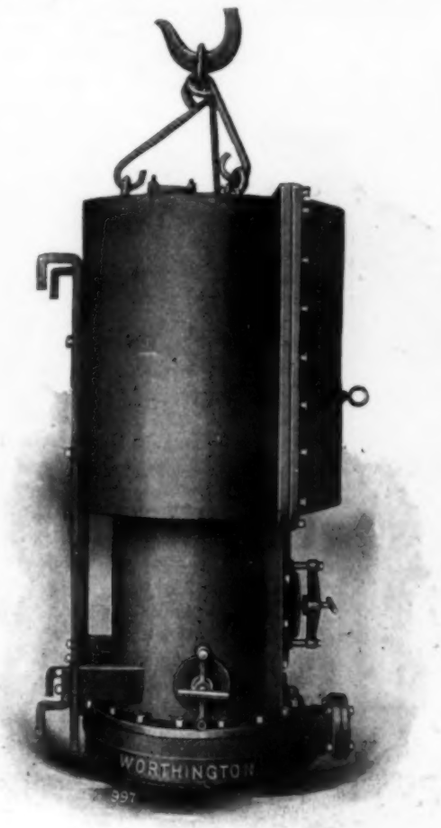
Attention has been devoted to the mechanical details in order to produce a machine that would withstand the most severe service for long periods of time without renewals or repairs. The bearings are supplied with ring oilers and are lined with babbit, hammered in, reamed true and scraped to a fit. In all except the very small sizes, these bearings have been separated from the pump casing, a construction eliminating all possibility of foreign matter working into the bearings when the pump is handling water containing silt or sand. This also makes it possible to renew the bearings without entirely dismantling the pump. The shafts are of machine steel.

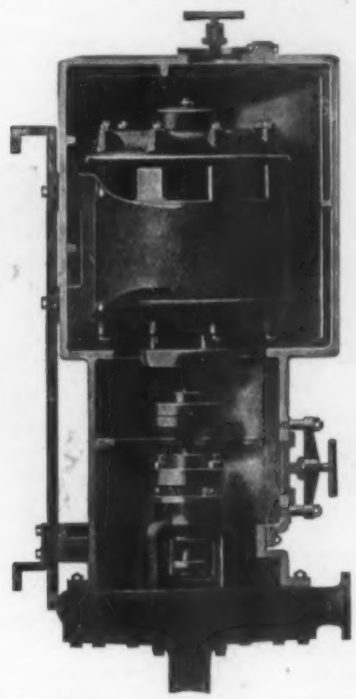
The usual method of compounding hitherto has consisted in combining separate pumping units, one discharging into the other through a complex system of piping. This is not used in connection with the Worthington turbine pump, on which only suction and discharge pipes are employed, the water entering axially and issuing radially. The impellers remain in perfect longitudinal balance, regardless of their number or the head against which the pump is operated, this balancing of the impeller being secured by a patented system of "triple vanes."

It is impossible to produce an efficient high-lift centrifugal pump unless the design secures nearly complete conversion of the kinetic energy of water in motion into potential energy of

water under static head. Since the so-called "whirlpool chamber" in the ordinary form of centrifugal pump does not average more than six inches in depth, and this space the velocity must frequently be reduced from 80 feet per second to ten feet per second, the open chamber construction is totally unsuited for high-lift service. In the Worthington turbine pump the efficient conversion of energy is assured by a patented system of diffusion vanes disposed in the throat opening between the periphery of the impeller and the annular casing, in much the same manner that guide vanes are placed in a reaction turbine water-wheel. These vanes form tangential, expanding ducts from which the fluid emerges at about the velocity existing in the chamber. They also eliminate all drag and friction between the periphery of the rapidly revolving impeller and the slowly moving water in the discharge chamber.

The Worthington turbine pump has created an entirely new field of application for centrifugal pumps, embracing mine drainage, water works, and numerous other services where rotary pumps are desirable but have not been employed, because heretofore inefficient at high heads.





FIGS. 2 AND 3.—3-INCH TURBINE SINKING PUMP.

As a sinking or station pump for mine service, the turbine pump has a field it fills well. There are no valves, guards or springs, no reciprocating parts, and there is not a contact surface except the shaft and its bearings. The design is such that parts subjected to the action of mine water may be made of acid-resisting metal, and lead-lined pumps can be supplied. The space occupied is less than one-third of that required by a reciprocating pump of equal capacity, and the first cost, including the motor for driving, is about one-half.

It is frequently found necessary to locate a centrifugal pump in a pit below the floor level, in order to get within suction distance of the water supply. In cases of this kind the vertical centrifugal has been extensively used. The pumps can be either belted or connected directly to vertical motors. In the latter method the motor can be located above ground where it is free from all moisture and can receive proper care. The design of the pump is such that it requires very little attention, and it is necessary for the attendant to go down into the pit only at long intervals. A number of these pumps are being used at blast furnaces and steel mills for general water service. They are also widely used in irrigation for pumping from wells in which the water level fluctuates greatly, often submerging the pump and rendering the use of horizontal belted or motor-driven pumps admissible.

The electric motor enters a widened field of usefulness through the improvement of the centrifugal pump. A motor-driven pump set is very similar in operation to a motor-generator set, the output being water under pressure in the first case, instead of electric current. At constant speed the power and output are inversely proportional to the resistance to flow, and the efficiency is practically constant within wide limits. The operation of pumps by electric motors is often a complicated problem. First of all, there are very few places where a constant delivery of water is wanted. To vary the quantity, then, it is necessary either to vary the speed of the motor or to provide a complicated and unsatisfactory system of by-pass valves, both of which methods are in general wasteful of power and unsatisfactory in operation. In some cases automatic devices are installed, intended to stop and start the motor whenever the pressure falls short of or exceeds certain limits. In the centrifugal pump, on the other hand, the flow is automatically regulated by the pressure, and the pump may be so designed that this regulation will be very close.

Fig. 1 shows a 36-inch turbine pump, with capacity of 35,000 gallons per minute against 160 feet head. Three of these pumps, each driven by a 2,000-h. p. motor, supply the grand cascade at the St. Louis World's Fair. Figs. 2 and 3 are views of the three-inch turbine sinking pump. With this type the direct-connected motor is enclosed in a cast iron housing. A 12-inch, two-stage, vertical turbine, designed for direct connection to a vertical-shaft motor is shown in Fig. 4. It is adapted to general water service in a large steel plant. The capacity is 5,000,000 gallons a day against 140 feet head.

The directors of the National Steel & Wire Co. declared the regular quarterly dividend of 1¾ percent on preferred stock and have approved the proposition to move the general offices of the National Wire Corporation, the subsidiary company owning the New Haven plant, from New Haven to New York.

The shops at Windsor, Conn., formerly occupied by the Spencer Automatic Machine Screw Co., and belonging to the estate of the late H. Sidney Hayden, have been sold at auction to Olds & Whipple for $1,825. The manufacture of machinery will not be resumed, but the buildings will be used for other purposes.

THE FOUNDRY APPRENTICE.*

BY CHAS. H. THOMAS, NEWARK, N. J.

This is becoming a serious subject. Where are the molders of the future to come from? In our larger cities it seems almost impossible to get good material for the purpose. Recently we advertised for two apprentices in one of our daily papers. We received one reply. We arranged for an interview, and the applicant put in his appearance. He was a likely young man of 17. His father was a saloon keeper, and the boy was so desirous of getting out of a business so disagreeable that he was anxious to start the next day to learn the foundry business in all its details.

In informed him that no matter what the nature of a business may be, it should be thoroughly investigated and thought over, before a final decision was reached. I invited him to visit the foundry the next day. I gave him full information as to the duties, the nature of the different classes of work, etc., so that he would have the situation before him, as it really was. His wages were to be 80 cents a day for the first six months, 90 cents the second six, and so on until the end of his indenture. Moreover, should he show adaptibility, the raise would be higher, depending upon his output and the quality of the work he turned out. He appeared pleased and desired to start the next day; but, alas, that tomorrow never came.

After leaving, he had evidently digested more thoroughly what I had told him. Four years looked a long way ahead. He never started, and will probably graduate as a crap-shooter, and eventually become a Tammany leader or perhaps worse. We have had four boys since. Three of them only stayed a day or two, and the fourth, with Teutonic persistence, is still at work and doing well, with every promise of becoming a first-class mechanic.

Why is it that we cannot keep apprentices? We pay them all holidays and overtime. We make life pleasant and agreeable, and give better pay for better work, "and still some are not happy." Is it the trend of the times? Who can say? But we do know that the boy of today wants more money for doing nothing and spoiling a lot of work than did the boy of a quarter of a century ago. Because the ways of spending money are today more numerous, dissipation more common and deplorable, that is no reason why the boy of today should be worth more than formerly. Cigarette smoking, immorality, emulation of the gilded youth who belongs in the reform school, and other pernicious habits, sap the energies of the average young man who presents himself at the foundry and render him unfit for the labor required there.

Where, then, are we to recruit the molders of the future from? The American city boy, with but few exceptions, shuns all labor meaning exertion. We must look to the country, or to the influx of foreign youths with an inborn desire to be independent and be masters of a trade. As we all know, the foundry trade is one requiring more than the mere pounding of sand. The boy from the country may or may not make a good molder, but he is sure to be a jack-of-all-trades, and as such he has a good constructive ability, becomes a good mechanic, and if not too smart, will become valuable to his employer, only to some day become an employer himself. The youth who leaves his native country to prosper here has a hard row to hoe, being handicapped by lack of knowledge of the language and ways of this country. But it is a good school for him, and with his usually very frugal habits he lays by a little all the time for a rainy day, and by the time he is Americanized, he has a trade and some coin of the realm.

If we are asking ourselves as a nation, whither are we drifting? so does the foundryman ask himself, Where are not only our future but even the present generation of good molders to come from? Where do they all go to? We never see many old men working on the floor, and very seldom hear of a molder dying. What becomes of them? Except in times of depression, there is also a scarcity of good molders. It is quite evident that foundrymen must recruit their apprentices from the available surrounding material, and inducements

FIG. 4.—12-INCH TWO-STAGE, VERTICAL TURBINE.

*Read at the American Foundrymen's Association, Indianapolis meeting, June, 1904.

must be offered to them, of such a nature that they will have their attention riveted, and strive to reach the goal as rapidly as possible. The foreman must take the boy into his confidence and not allow him to go to a molder for his information at all, or allow the molders to make suggestions to him. I have tried this method with conspicuous success.

I tell the boy what facing to use, where to set his sprues and risers, if any; how to cut his gates; and then leave him alone until he gets stuck and asks for aid. Then I take him all through the part of the work he has done right, up to the point where his difficulty commenced, make several suggestions as to the different ways in which the job can be secured, and ask him which would seem to him to be the quickest and best. If he does not select the best way, I suggest it to him. If there are more than one off the pattern, and there are several ways to do the job, I advise him to try each a different way, and let me know the result. When he makes his report he has had time to think, and generally has selected the easiest way suggested. With a smile, he says that it seems twice as easy when he knows how and that he can make the next one in very much less time, invariably doing so, if not interfered with by the molders.

I praise his castings when they are turned out clean and sound, and when a bad one is made, the boy and I hold a post-mortem examination on it, decide upon the fault, and look for the remedy. These are things that boy will never forget. In this way I try to have the good and bad results leave a permanent impression.

As the boy advances, we give him a chance to make extra time, and it is surprising to note the special energy an hour or two a day put in by the boy when a job is given him which will keep his mind occupied and hustling. We make it a practice of paying our men for what they do in the way of good work. We never allow a boy to close a poorly finished mold. He must learn to make a neat, clean mold, before he can attain speed. He is told that a neat, clean workman can always be picked out by his personal appearance, and the condition of his floor and tools.

Just as soon as the boy begins to show an improvement, we start him ahead by giving him better and better work, not forgetting the little raise from time to time with the extra accompanying it, the idea being to keep the boy satisfied. It is surprising to see how they will vie with each other to get out the best job in the shortest time. This may sound like a fairy tale, but can be readily verified by personal inspection any day.

Now for the very important matter of the apprentice ratio. The Molders' Union allows one for the shop and one for every eight molders. In other words, that which was good enough forty years ago, but is obselete now. The foundrymen are wanting one to six, but this like other modern ideas the molders will not give. Nevertheless it is a question for concerted action by both parties, and the nearer the apprentice ratio is brought to one to five the better, even if the apprentice be adjudged proficient in one or more branches of the trade only. If the ratio is not increased and the trade itself made more attractive to the young man, the scarcity of good molders will soon become a calamity.

While we cannot have Brussels carpets in the foundry, we can clean up at least once a week, and thus teach boys and men the value of being systematical. Start the boy with a trial of two months, and if in that time he does not show his adaptability as a mechanic, he never will. We do an act of kindness in advising him to make an effort elsewhere. On the other hand, when we find a boy who by industry and energy forges ahead, and who desires to learn, we do him a gross injustice to keep him on one class of work because we may happen to make more money out of him that way. The apprentice should be given the best work in the shop, as soon as he shows that he is able to tackle it. We contract to teach the boy a trade. If he is bright, push him along. If he is dull drop him, as he will only become another candidate for the minimum wage. What we want is maximum days' work, with maximum days' pay, and none of the other. Only then will the laborer be worthy of his hire.

New Railway Equipment Ordered.

The Cincinnati, Hamilton & Dayton-Pere Marquette consolidated system has placed an order for 5,000 box cars and 40 locomotives. The cars will be built by the American Car & Foundry Co., while the American Locomotive Co. has received the order for the engines. The Erie railroad has ordered 500 box cars of the Standard Steel Car Co. and ten express cars of the American Car & Foundry Co. The Norfolk & Western has ordered 600 cars of the American Car & Foundry Co. and will build 250 cars in its own shops at Norfolk. The Lehigh Valley has ordered 100 produce cars of the Standard Steel Car Co. and is in the market for one cafe and one combination car. The San Pedro, Los Angeles & Salt Lake is in the market for 750 steel gondola cars, 200 box cars and 50 stock cars. The Chicago, Rock Island & Pacific is preparing specifications for 65 locomotives. The Manistee & Northwestern has ordered two mogul locomotives of the American Locomotive Co. The Buffalo & Susquehanna railroad has placed orders for the construction of 350 steel coal cars and ten locomotives to take care of the increase in the company's coal traffic due to the opening of the southern branch to Du Bois, Pa. The locomotives will be built by the American Locomotive Co.

Resumption of Homestead and Valley Mills.

All departments of the Carnegie Steel Co., at Homestead, Pa., with the exception of the 119-inch plate mill which is being changed over to an 84-inch mill, resumed operations this week double turn. This is the first time in nine months that the plant is operating so completely. The Bessemer converting department, which was off for several weeks, also resumed. Two of the Carrie furnaces are idle, receiving new linings, but will resume as soon as this work is done.

The Republic Iron & Steel Co. resumed operations at its Bessemer plant, Youngstown, O., this week and parts of the Brown-Bonnell and the Valley plants also resumed. The three-high plate mill at the Sharon plant of the Republic is being removed to the Valley plant at Youngstown, where it is replacing the two-high mill at that place. The Sharon mill is modern in every particular and will give the company a greatly increased output. The Sharon plant has been idle for some time and it is doubtful if it will be operated in the future.

Latshaw Pressed Steel & Pulley Co.

William H. Latshaw, who for several years was first vice president of the National Tube Co., Pittsburg, and who resigned owing to ill health, has organized the Latshaw Pressed Steel & Pulley Co., with a plant at Allegheny, Pa. Mr. Latshaw has devoted the greater part of his life to the tube business, having been connected with the Pennsylvania Tube Works, Pittsburg, prior to its absorption by the National Tube Co. In Allegheny his company purchased the buildings of the Bradley Mfg. Co. and a part of the power equipment. Pressed steel split pulleys will be manufactured by the Duff patents and other pressed steel specialties are to be manufactured. A large press is already being installed, and the equipment will be added to in the near future. Pressed steel gongs and bells will be among the specialties manufactured, special claims being made for the tone of these bells as compared with that of bells made of the most expensive alloys.

The steel freighter, Augustus B. Wolvin, made a new record in ore carrying July 13, when she left Escanaba with 10,973 gross or 12,285 net tons of iron ore for South Chicago. The cargo was unloaded at South Chicago on the following day in a little more than ten hours, with the Hoover & Mason clamshells at the north slip of the Illinois Steel Co. Until this year the record for iron ore cargoes was held by the steamer William Edenborn, which delivered a cargo of 8,807 gross, or 9,864 net tons of ore at South Chicago last year.

The Lackawanna Steel Co., Buffalo, N. Y., is now turning out about 1,300 tons of steel rails daily. The highest run yet reached was 1,600 tons. The output is chiefly made up of 80 to 100 pound rails. The plant is, however, producing light rails of from 25 to 40 pounds. The company will have its structural mill in operation Aug. 1.

The Morgan Construction Co., of Worcester, Mass., has recently opened a New York office at No. 40 Exchange place, in charge of E. A. W. Jefferies.

POLLOCK SYSTEM OF BOSH COOLING PLATES.

The Pollock non-pressure bosh cooling plate system possesses features which commend themselves to furnace operators and have attracted considerable attention in blast furnace practice. In addition to accomplishing its work of cooling it precludes the admission of water to the inside of the furnace. Having open water connections it makes easy cleaning, and, with accurate regulation of water, maintains a minimum flow. There is visible water supply and discharge from each plate and the system affords immediate detection and location of a leaky pipe. In the event of an accident to the plate the water can be kept on the plates until it is convenient to make repairs, without further injury to the plate.

The bosh cooling plates are hollow castings with a divided partition, as shown in Fig. 2. The narrowing of the inner compartment diminishes the inner water course, thus producing a more rapid circulation and an increased cooling effect in the hottest place. The water supply and discharge is through the holes in the projecting end of the plate. These holes are fitted with open or disunited pipe connections which prevent any water pressure on the plate, thereby insuring against the entry of water into the furnace, should a leak occur, the blast pressure intercepting any water from a leak and forcing it out through the open funnels and tees which are provided for such occurrences.

Fig. 1 shows a furnace bosh with bosh plates in position and the pipe connection of this system. The pipe A is a circular supply pipe extending entirely around the furnace shell. The pipe B is one of the down-take mains, one attached to each furnace column by which they are supported. It will be seen that the down-take pipes are readily protected by the columns in the event of accident. The ample space obtained for the removal of the plates is also apparent. C indicates the supply pipes leading directly from the mains B to the bosh plates.

The water supply and discharge is accomplished as follows: Water is taken from the circular supply pipe A and in place of tight fittings connecting directly to the plates, open connections are used which permit the water to flow into the open funnel E, this being located 12 inches above the inlet openings in the plates. The water then courses through the plate, passes out the discharge pipe D and is elevated six inches to the opening tee F, through the side openings of which it descends in the pipe G, emptying into the funnel E on the plate in the next row below. In this manner three or more plates are suplied from one opening, and all without being under pressure.

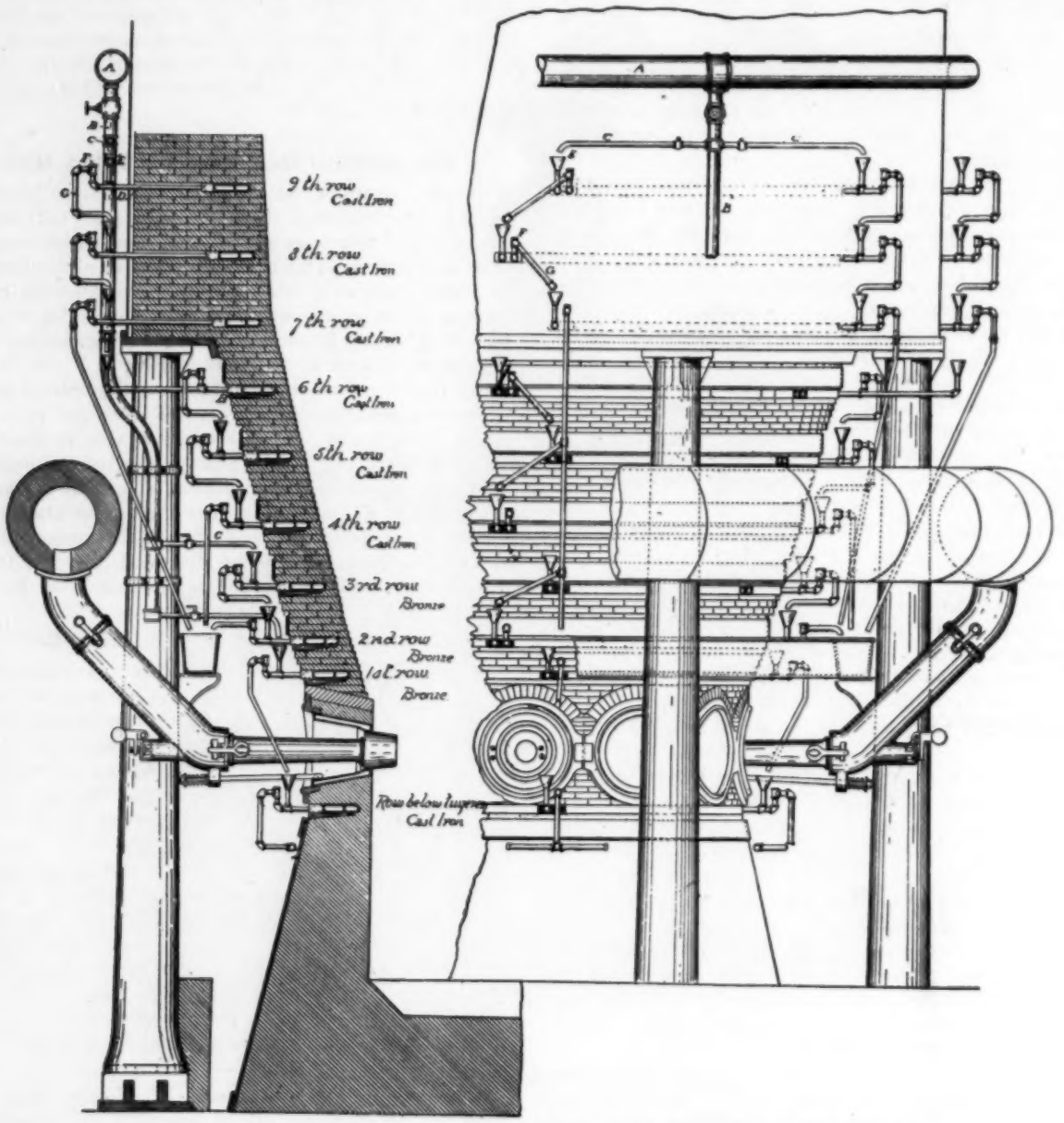


FIG. 1.—FURNACE WITH POLLOCK BOSH PLATES IN POSITION, SHOWING PIPE CONNECTION.

A leak by a plate burning out is immediately detected by the appearance of water, steam or gas from the funnel E and open tee F being forced out by the blast pressure. Should the furnace be working poorly, requiring all attention, and a leak occur it does not require immediate attention as the water is kept free from the furnace until repairs or replacements can be made. Should the furnace be working cold and less water be desired, regulation is easily accomplished, the exact amount of supply and discharge being visible all the time. If the curtailed supply at this time is inadequate, this is immediately shown by the emission of steam from the open connections.

To clean the plates a pressure hose inserted in the funnels produce a circulation rapid enough to carry off all sediment. A plate can be removed and replaced by the pulling out of a

specially formed cast iron wedge which loosens the plates and permits its removal. The same wedge is used to hold in position the fresh plate. The Youngstown Bosh Plate Co., Youngstown, O., is the builder of this system.

LAKE SUPERIOR IRON MINES.

In connection with the rate of freights for ore on the lakes it is interesting to note that last year the Pittsburg Steamship Co. put one of its 3,500-ton steam vessels in the Escanaba trade when freights from that port were 60 cents a gross ton to Lake Erie and 50 cents to Chicago. This ship's earnings were computed for nine consecutive trips and it was found that she had lost 2 cents a ton. At that time charges against the ship were a trifle higher than now, the unloading charge, for instance, being 21 cents a ton against 19 cents now. But this week the freight from Escanaba has reached 50 cents a ton to Lake Erie and 40 cents to Chicago, and owners of even fair sized ships of the better class are carefully keeping out of it. An effort is made to establish the rate from Marquette to Lake Erie at 60 cents a ton, a decline of 5 cents. The steamship A. B. Wolvin has just delivered at South Chicago docks of the Illinois Steel Co. a cargo of 11,083 gross tons of iron ore from Escanaba, with a draft of 20 feet. It is possible to load the greater depth between these ports than on the run from Lake Superior to Lake Erie, where the Lime Kiln crossing, near Detroit, is the shallowest point and the regulator for draft. There are 19 feet of water over the Lime Kilns. The Wolvin was built on a guarantee of

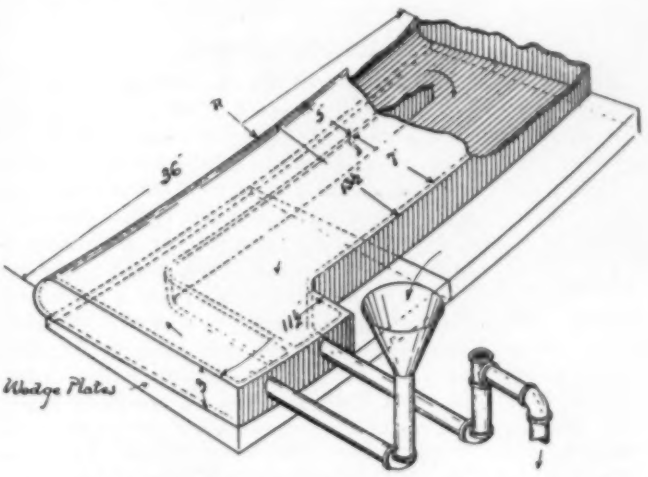


FIG. 2.—VIEW PARTLY IN SECTION SHOWING CONSTRUCTION OF PLATE WITH PARTITION.

10,000 gross tons on 19 feet and can do it with ease. The Wolvin's cargo is to be compared with that of the Wm. Edenborn, of the Steel Corporation fleet, delivered at South Chicago last summer, amounting to 8,800 gross tons. With the advent of the larger ship, freight rates adjust themselves to it, and the smaller vessel, even though it may be of large size, finds itself adjusted out of profits. This, to be sure, is not the condition when there is more tonnage to be moved than vessels in which to move it, but that is not the condition this year, nor does it seem likely to be the condition for some time to come. With a concern like the United States Steel Corporation on hand, willing and able to supply itself with ships if its ideas as to rates are not given due consideration, there is no probability of high freights for a long time. On the other hand, there is the constant fear that fleets having no connection with tonnage producers, either ore, coal or grain, may be without stuff to carry, at any rate. That this fear is felt, today, by some of the large independent vessel owners is quite evident.

Daily shipments of iron ore from the head of Lake Superior, the docks of the Duluth, Missabe & Northern, the Duluth & Iron Range and the Great Northern roads, amount to between 90,000 and 95,000 gross tons. The first named leads with an average shipment of about 40,000 tons. Between 50,000 and 60,000 tons a day are going over the docks of the various other roads that reach the lakes at Ashland, Marquette, Presque Isle, Escanaba, Wells and Gladstone. This is a very large business and is likely to be maintained for some months.

Stockpiles of ore on surface at the commencement of shipping season are running off very fast, and in some cases are pretty well gone. There has been trouble recently from frost in these piles, as shipments have been quicker than the sun's thawing out ability. When stock piles are exhausted and the daily shipment must be from daily hoists there will be a slight falling off in traffic, though the output of steam shovel mines is so large a percentage of the whole that the difference is less marked now than formerly.

Pickands, Mather & Co. have abandoned Verona mine, Menominee range, and after shipping the stockpile will strip the property of their effects and leave it. They will increase shipments from their Hemlock and from the still active Verona Mining Co.'s mines by about 90,000 tons over last year. Their Albany mine, Mesabi range, is now shipping about 1,000 tons a day. It has just been developed into a milling property.

Biwabik mine, at Biwabik, is mining with four shovels and ships about 5,500 tons a day. This rate will be maintained some time. The company is also stripping on the northwest corner of the pit and on the east side with two shovels.

On the eastern Mesabi underground mines shipping from stock includes the Genoa, Malta, Elba, LaBelle, Franklin and Bessemer. These mines are also shipping their daily hoist. Pettit and Duluth are underground mines shipping from hoists only, and Biwabik from open pit. Stevens, which has developed to be a very important open pit shipper, and lies east of Biwabik, is not sending out ore, but may do so late in the year. It has never made a shipment, though it has been the scene of extensive and costly operations for the past two years and more. Miller, south of Stevens, will soon be shipping its daily hoist. Wills, near Elba, will not ship this year. Corsica is idle. Cass, near Biwabik, may ship later. Holland will probably do nothing this year. This list includes everything east of the villages of Eveleth and Virginia.

There are indications of a revival of exploratory activity, on a moderate scale, through the Mesabi district. Drills are asked for and several propositions are under consideration, any one of which may mean the employment of more or less drills. The bulk of work undertaken this year will be rather inexpensive churn drilling.

Eastern Steel Co.'s New Mill.

It is expected that the contracts will soon be awarded for the new 28-inch structural mill to be built by the Eastern Steel Co., Pottsville, Pa., in accordance with the plans drafted by the Garrett-Cromwell Engineering Co. Four open-hearth furnaces have been completed, but it is not expected that the two additional furnaces provided for in the original plans will be built in the near future. After the completion of the 28-inch mill the company will have a finishing capacity of 120,000 tons per year. The only part of the plant now in operation is the bridge works, with a capacity of 25,000 tons per year. The entire plant will represent an expenditure of more than $2,000,000.

The De Beers Mines Co., Ltd., Kimberly, South Africa, has cabled an order for a third Westinghouse-Parsons steam turbine generating outfit of 1,500-k. w. capacity for its power plant at Kimberly. The new turbine unit will be similar in every respect to the two, which have been in operation for somewhat over a year.

Vice President Drummond, of the Lake Superior Corporation, makes the following statement in regard to the company's plans: "The policy the new company will follow will be regulated by the reports of General Manager Shields. The time at which the steel rail and other plants will be started will depend on the recommendations on these reports; notwithstanding the times a number of the plants have been closed down we found them all in a very satisfactory condition. As we had already received large orders for Helen mine ore we decided to put the mines in operation at once, and the ore will be shipped as rapidly as possible to Cleveland and Hamilton, Ont. We are of the opinion that we have now a sufficient amount of capital to make the works go."

POLISHING MACHINE AND DISC GRINDER.

In Fig. 1 is shown the Patterson emery grinder which carries 10 x 1½ emery wheels fitted with a flanged pulley. Beside it is an attachment which can be used with any make of grinding machine. This is fastened to the floor by two lag screws,

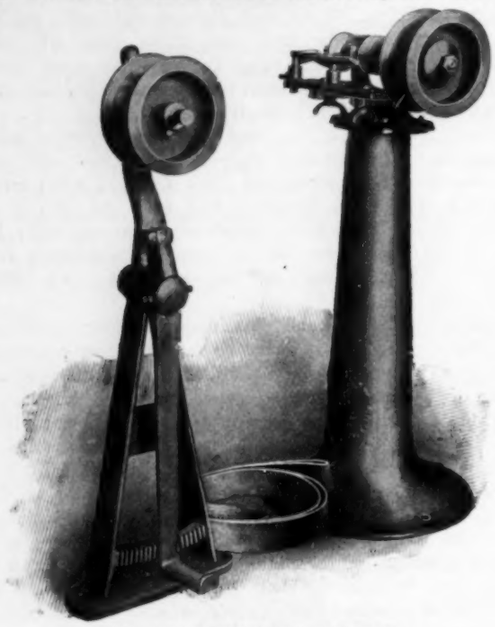


FIG. 1.—PATTERSON DISC GRINDER.

an endless polishing belt (shown on the floor) running over the two flanged pulleys which are 7 inches in diameter and capable of carrying a belt 3 inches or less in width. A simple arrangement is provided for tightening and loosening the belt. The stud on which the flanged pulley revolves is drilled with

FIG. 2.—PATTERSON BELT POLISHING MACHINE.

holes at right angles to each other, and the end is tapped out to receive the compression grease cup shown. This device insures clean and economical lubrication. The two pulleys and the attachment weigh 105 pounds. The horizontal adjustment is 7 inches.

In Fig 2 is the Patterson disc grinding machine, the manufacturer's regular 10 x 1½ in. It is fitted with ball thrust bearing and 12-in. steel disc on one end of the mandrel, and an adjustable tilting table, 9 in. by 12 in. The steel disc is reversible, held by countersunk head screws, and emery cloth or paper discs are glued on to the sides of the disc which is finished rough so as to make a good holding surface. This machine is employed for grinding and finishing flat surfaces, either from rough stock, or when taken from the planer, shaper or milling machine.

The manufacturer of both tools is the Miami Valley Machine Tool Co., of Dayton, O.

Alabama Steel & Wire Co.'s Steel Plant.

The experience at the new open-hearth steel plant of the Alabama Steel & Wire Co., at Gadsden, Ala., has been unusual for a new plant. The ability to get uniformly good heats has been a feature of the work almost from the beginning, and with steel coming from the furnaces at high and well maintained temperatures its excellent working quality has been a matter of comment. Its softness has been surprising to the workmen, some of whom, trained at Bessemer plants, have pronounced the Gadsden steel the easiest to work in all their experience. In one department of the wire mill at Ensley on one day last week out of 100 tons of finished wire there was but 480 pounds of scrap and bad wire. Two 50-ton furnaces are in steady operation, producing 100 tons each per day. The steel draws down finer than in certain Bessemer plants, is softer in the barb mill and gives no trouble in the rod mill.

Shelby Iron Co.'s Report.

Shelby Iron Co.'s statement for the year ending March 31, 1904 is as follows: Profits for year, $171,878; net, $170,343; depreciation, $4,510; balance, $165,833; dividends, $149,685; surplus, $16,148; previous, $210,414; total surplus, $226,562.

President T. G. Bush, says in part: "During the year $10,105 was charged for stumpage and timber rights. Twenty-five cents per ton of iron made during the year was charged into cost of iron for extraordinary or prospective repairs. This account showed at the close of the year a credit of $11,287. Of the 14,594 tons of iron on hand March 31, 1904, 5,145 tons were applicable to sales already made at the date of preparing this report. We have on hand more than 17,000 tons of iron, with about 3,200 tons due on orders in hand. The total amount spent on improvements for the last thirteen years has been $190,051, and depreciation charged for same period $57,188. Available assets amount to $378,389 and current liabilities to $26,209."

The plan to reopen the plant of the Cramp Steel Co., Ltd., Collingwood, Ont., has been evolved by a committee which has been considering the subject for some time. A mortgage on the plant was to be foreclosed, but it is expected that the reorganization of the plant will prevent foreclosure. It is proposed to organize the Northern Iron & Steel Co. with $2,500,000 authorized capital, half common and half preferred.

A meeting of the creditors of the United Sheet & Tin Plate Co., Marietta, O., adjudged bankrupt on June 21, has been called for July 22, at which a trustee will be named. Liabilities are scheduled at $249,000 and assets at $273,000. Judge Thompson, of the United States Court, has stated that he would enter a decree of foreclosure Aug. 2, after which the property will be offered for sale.

B. F. Sturtevant Co. announces the removal of its entire plant from Jamaica Plain to Hyde Park, Mass. With nine acres of floor space and all modern appliances, the company will continue to manufacture the well-known Sturtevant products—blowers, engines, motors, economizers, forges, steam heating, ventilating and drying apparatus, etc.

The directors of the Rogers Locomotive Works have declared the regular quarterly dividend of 1½ percent on preferred and common stock.

A NEW STEEL BELT CONVEYOR.

The Triumph steel belt conveyor recently designed by the C. O. Bartlett & Snow Co., Cleveland, is intended to take the place of rubber or gandy belt conveyors. It is made entirely of iron and steel. It is especially adapted for conveying large quantities of ore, coal, crushed stone, clay, marl, castings and all kinds of similar materials. As an ore or coal sorting table its special points are its slow speed, large capacity and durability. The material can be discharged at any place by the discharge plow or it can discharge at the end.

It is constructed of one strand of special chain 24-inch pitch with a working strain of more than 10,000 pounds, fastened together with special steel pins with self-oiling rollers at each end which run on a steel track, usually supported on cast iron stands, although wood supports can be substituted. There is a steel sprocket wheel at each end securely fastened to steel shafts. At the front end are heavy stands with take-up boxes. The drive end has steel countershaft with heavy gears and drive pulley. On each link is fastened a special saddle attachment for supporting the steel belt which is made in sections 24 inches long and wide enough to give the required capacity, and all bent in a concave or troughing form, though it can be straight if desired. One end is fastened to the special saddle attachment, the other end so fastened as to move

TRIUMPH STEEL BELT CONVEYOR.

forward and back, allowing it to pass around the sprockets. These pieces of steel thus form a continuous steel belt or troughing conveyor.

Late Pittsburg News.

(Special Telegram.)

PITTSBURG, July 20.—A conference will be held on Friday between the employers of the American Steel Hoop mills at Youngstown and the Carnegie Steel Co. to setlle the wage scale. The Amalgamated Association has nothing to do officially with the conference.

It is considered certain that Thomas Morrison will succeed Charles M. Schwab in the directory of the United States Steel Corporation.

The Ohio plant of the Carnegie Steel Co. will close down next week for repairs.

The house workers are still conferring with the American Sheet & Tin Plate Co. on the tin house scale. A conference will be held tomorrow with the Amalgamated Association on the rebate feature of the scale.

The Cambria Steel Co. has taken a contract for 8,000 tons of bolts for the Pennsylvania terminal at New York.

A large plant is to be built at Elm and Commerce streets, Cincinnati, for the W. F. Robertson Steel & Iron Co. The property, fronting 78 feet on Elm, with a depth of 200 feet on Commerce street, was bought by the Globe Rolling Mill Co., and was retransferred to the Robertson company. There will be a large warehouse which will have a switch running alongside.

OBITUARY.

James Reilley, superintendent of the blacksmith department of the Pullman Car Co.'s works at Buffalo, died in that city on the 13th inst. of pneumonia. Mr. Reilly was widely known for his mechanical and inventive ability.

George H. Longbottom died July 8 at his home in Paterson, N. J. He was born in Paterson in 1859. Thirty years ago he entered the employ of the Rogers Locomotive Works as an office boy. He rose to the presidency of the works and held that position until Jacob S. Rogers, the principal stockholder, gave the order to close down the plant. When the present Rogers Locomotive Co. was formed Mr. Longbottom went with the American Locomotive Co.

Hon. George Beale Sloan, a wealthy and prominent citizen of Oswego, N. Y., died July 10, in his seventy-fourth year. To Mr. Sloan belongs the credit of establishing the railway steel spring business in Oswego. In 1882 he provided the capital for the firm of Cliff & Righter, which afterwards became the Oswego Railway Springs Co. He retired from the company when it was reorganized as the National Railway Springs Co. Mr. Sloan served with distinction in the New York General Assembly and held other positions of prominence in political and business affairs.

Charles E. Fay, oldest son of Capt. Marcus L. Fay, died July 13 at his home in Virginia, Minn., aged 31 years. Mr. Fay was associated with his father in a number of iron mine interests and was well known throughout the Minnesota iron district.

Harry E. Fowler, assistant superintendent of the 28 and 38-inch mills of the Homestead plant of the Carnegie Steel Co., Pittsburg, was killed by a fall from a crane in his department on July 14. He was 35 years old and went to the Carnegie Steel Co. from the Maryland Steel Co.

An appropriation suit filed July 19 at Lorain, O., by the Lake Erie & Pittsburg railway, reveals the terminal plans of that road. The land sought to be appropriated is fifty-five acres in an angle of the river north of the steel plant of the National Tube Co. Ore docks, work shops, side tracks, depots and a roundhouse are to be constructed. The plan, filed in connection with the railway's petition, shows a proposed slip, which will be dug in an easterly direction from the river and extend several hundred feet. Ore hoists are to be erected beside the slip as well as on the parallel stretch of river to the south, so that ore will be dumped from both sides upon a narrow stretch of land between the slip and the river. This strip of land is a gridiron of tracks, giving opportunity for unloading by fast hoists into cars as well as into stock piles for storage. The machine shop and roundhouse are located to the north of the docks.

William B. Munnis, formerly sales agent of the Lewis Foundry & Machine Co., Pittsburg, has entered the iron and steel brokerage business with offices at 620 Lewis building, Pittsburg. He handles all kinds of iron and steel products and coal and coke and also represents the Indiana Shovel Co. and the Indiana Rolling Mill Co., of New Castle, Ind.

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IRON TRADE FACTS VS. PREDICTIONS.

It is neccessary to draw a line between prophecy and current history in the iron market. The two varieties of literature are being produced just now and the indiscriminating reader may find some difficulty in deciding where the one ends and the other begins. Powerful interests centered in New York and representing abundant capital have decided that the iron trade will show marked improvement in the fall, or at all events before the end of the year. The Presidential campaign in the opinion of these interests holds little threat of harm to the country's industries. Whichever candidate is chosen, it is argued that a financial policy is assured which will mean the preservation of the gold basis for our currency; and though a Democratic House is elected it is argued that the majority in the senate which is assured for two years would prevent any hurtful legislation, while even at the worst the tariff changes contemplated by the St. Louis platform would be far more conservative than the Wilson bill and are not to be feared. As to the other uncertainty—the crops—the view taken is that barring an extraordinary calamity the West and South will get from the ground this year at least the average yield of the past five years.

On this favorable view of the election and crop outcomes, the interests referred to have reached the conclusion that the iron trade will soon take on new activity, that the railroads will have increased earnings, and that with cheap money and a measure of recovery from the consolidation excesses that culminated in 1903, the country will move on again and find in 1905 a year of remunerative business in all lines.

We do not quarrel with the prospect thus held out. The manufacturing world, and particularly the metal-working industries of the country, cannot too soon break away from the monotony of dullness that has been upon them for many months. But some developments of the past two weeks emphasize the need of distinguishing between the facts about our industries—particularly the iron trade—and the hopes and beliefs and wagers of Wall Street as to what is shortly to come to pass. Men who have considered themselves in close touch with the iron trade have rubbed their eyes on reading in New York papers lately the daily bulletins of improvement in iron and steel. As a matter of fact while the iron market reviews by way of New York financial pages have given us the story of increased activity, of resuming mills and widening demand, the iron trade, as indexed by order books, has been growing quieter, with no difference of opinion among those who know, on the statement that domestic consumption in the third quarter of 1904 will be smaller than for either quarter preceding.

Without doubt the Eastern influence referred to is of some value in begetting confidence—its very hopefulness may help in the fulfillment of its predictions; but it needs to be kept in mind that the iron trade cannot be improved by misrepresenting its real condition. The law of supply and demand is still operative, and there is no good substitute for a full order book in dealing with trade conditions as they really are.

CONSOLIDATIONS AS DISTRIBUTERS.

The small "independent" finishing mills are showing themselves more hardy in the present dullness of trade than was anticipated by any but their staunchest friends. When everything was at top notch there was a tendency to criticise the complacency with which such mills regarded the narrow spread between semi-finished and finished products and looked forward to better things when a decline in demand had brought out a new alignment of prices.

The fact is that the smaller mills have a flexibility and adaptability in the administration of their affairs which give them one telling advantage over their great competitor. Some of the tales that are told show how important this advantage is or, perhaps more correctly speaking, how greatly disadvantaged the big compnay is compared with its small competitors.

Some of the iron and steel consolidations have shown a surprising inability to handle those small orders which are now eagerly sought. Every buyer has his own tale of woe as to difficulty in getting prices on standard commodities and obtaining information as to when shipment is likely to be made. Prospective buyers are frequently bandied from one office to another for a mere quotation, and when the order has been placed cases are cited where from two to half a dozen promises, each requiring from one to two weeks in the making, preceded the actual shipment. A buyer must frequently resort to ways which to him appear most devious, in order to obtain information of any sort. Thus a prospective customer located in the same city as the main office of a consolidation, desiring goods for shipment to a distant point, is frequently referred to the branch office at that point, although it is well

understood on all hands that the query would but come back to the main office for answer, and this not in complicated cases but in such a simple instance as where the buyer simply wants to know whether an order if placed would find the desired goods in stock and ready for shipment.

There is no question that the derelictions referred to are largely due to an inability on the part of the middle class employes of large corporations to realize that the greatness of the corporation is a matter of synthesis—that its business is made up of parts, and that these parts, though individually small, are a necessity. Especially at this time is business made up of small parts, and it is now in particular that small orders should receive attention instead of the cavalier neglect which so often meets them.

Not the least peculiar phase of the troubles referred to is the fact that at Pittsburg, the home of several subsidiaries of the steel corporation, and of one consolidation in a cognate branch, the buyer meets with unusual obstacles. Finished steel products which can be obtained with comparative ease at Cleveland, Chicago and many other points are frequently bought and delivery secured through Pittsburg only with the greatest difficulty. A widely advertised product of one subsidiary is only occasionally carried in stock at Pittsburg, although it can be bought out of store in dozens of other cities, while competitive products made by independents can be obtained in Pittsburg out of store with ease.

Consumers can deal with the independent finishing mill with comparative comfort. No order is too small for the independent, who will name a price promptly, and is ever ready to give information substantially on the spot as to when the material will be shipped. The independent actually evinces pleasure at the receipt of an order, and shows a desire to fill it.

The large consolidations have no doubt proceeded on the theory that the proper distribution of their goods is through a jobber, which is well enough in a way, but does not cover the whole case. In Pittsburg, at any rate, the jobbers have not been found in a number of instances. At other points the jobber is frequently unable, through press of demand, to carry stocks in prosperous times, and is unwilling to do so in dull times. Of some goods it does not pay to carry stocks, and direct shipments must be resorted to, with their attendant vexations. Many jobbers have developed a well defined policy of giving to the large consolidations their orders for stock and giving to independents their orders for direct shipment. The fact that in times like the present the direct shipment orders constitute a larger percentage of the total business than ordinarily easily explains why small independent producers, who are capable of attending to their business, are now able to run.

It is a question whether the large consolidations can remedy the circumlocution evils which are complained of by some and made a subject of mirth by others. Neither the profit-sharing plan nor the wholesale salary reductions have helped matters. It is a problem which remains to be solved, and there is even room for doubt whether it is fully realized that the problem exists. Certainly there has been evident in certain circles for two years a feeling that one of the consolidation's great missions is to "educate" the various independents not to indulge in price cutting. The independents have vastly stronger trade-getting methods than that. If there is need for education it is for a kind of education that ought to begin at home, an education that recognizes promptness and efficiency in handling business as a fundamental requisite to success.

Personal.

Edward St. John has been appointed assistant treasurer of the Westinghouse Electric & Mfg. Co., with offices in New York. He was promoted from the position of assistant auditor with headquarters at East Pittsburg, Pa.

Edward F. Neukom, chief engineer and superintendent of the Racine Engine & Iron Works, Racine, Wis., has tendered his resignation to accept a position with the Brown-Corliss Engine Works, Corliss, Wis. Before leaving Racine Mr. Neukom was presented a diamond ring by the employes of the Racine Engine & Iron Works.

Dr. Schuyler Skaats Wheeler, president of Crocker-Wheeler Co., electrical manufacturers, sailed last week with Mrs. Wheeler on the Baltic.

Louis Terven, E. E. (University of Wisconsin), has recently been appointed chief electrician of the Nernst Lamp Co., Pittsburg, Pa. Mr. Terven was for some time electrician of the United States Navy Yard, Port Royal, S. C., which position he resigned to enter the experimental laboratory of the Nernst Lamp Co. Later he was given charge of the chemical engineering department of this company.

Fred C. Harris, a general foreman of the American Steel & Wire Co. at its Central plant, Cleveland, has resigned to accept the position of superintendent with the Zenith Furnace Co., Duluth, Minn.

New Power Enterprise for Niagara.

The Niagara County Irrigation & Water Supply Co. took steps this week to revive an old project for a power canal at Niagara Falls which will produce 150,000 h. p. and involve an expenditure of about $10,000,000. A map which has been filed with the proper authorities shows the route of the canal, which will be 37,500 feet long, 120 feet wide and 20 feet deep, to extend from LaSalle, on the American side of the Niagara river above the falls around the easterly limits of the city of Niagara Falls to "Devil's Hole," a natural embouchment in the wall of the gorge just below the whirlpool, at which point there is a sheer drop of 300 feet from the brink of the precipice to the bottom of the gorge. Here the generating plant and power house will be constructed, the generators being located at the bottom of an immense penstock 300 feet in height, giving a greater drop to the water flowing onto the turbines than that of any other power company, the distance of fall to the turbines in the tunnel of the Niagara Falls Power Co. being only 140 feet. The company's charter was granted in 1891 and has been kept alive since that date, its provisions being very broad and comprehensive. The incorporators have expended over $700,000 in excavations at LaSalle and in the acquiring of land. Condemnation proceedings have been begun for the remainder of the land required and it is stated active work on the project will be at once proceeded with.

Charles B. Wortham, of Buffalo, is president of the company, and Col. M. H. Alberger, of New York, chief engineer. Capitalists of New York city are financing the enterprise.

Dodge & Day, of Philadelphia, in conjunction with Ballinger & Perrot, architects, are rebuilding and extending the plant of the Victor Talking Machine Co., Camden, N. J. The shops are to be electrically operated and motor drives used throughout. This concern suffered severe damage by fire a short time ago.

Daniel Ashworth, of the Pittsburg Boiler & Engine Co., Park Bldg., Pittsburg, has closed the commercial end of his business and will give his entire attention to mechanical engineering on steam engines, boilers and transmission of power.

The report that the Jones & Laughlin Steel Co. contemplates the erection of a tube plant at Pittsburg has been officially denied.

The Labor Situation.

STOVE MOLDERS' APPRENTICE RATIO OF 1 TO 5.

The July issue of the *Iron Molders' Journal* contains the following on the recent action of the executive board of the Iron Molders' Union, bearing upon the relations of the union and the National Founders' Association, and particularly on the lowering of the apprentice ratio from 1 to 8 to 1 to 5 in the foundries of members of the Stove Founders' National Defense Association. The article is significant of the change that has come over the foundry situation in the past year:

"The recent session of the executive board was held at a time when grave conditions were facing the organization, and the result of their deliberations may have a far-reaching influence for weal or woe during the remainder of the year. Trade conditions during the past six months have not been entirely favorable to the foundry, and while there has been no cause for serious alarm, the desire to retrench expenses had led some foundrymen to demand reductions in the wage rate, and in a few instances to enforce a cut, which has led to a strike, as neither the local nor the national organization believed themselves justified at the time in accepting the foundrymen's demand.

"Another situation that required their careful consideration was that created by a number of the members of the N. F. A. in declining to enter into joint trade agreements for the coming year unless certain clauses were incorporated to which it was impossible to give approval. There were also presented for their consideration a number of petitions and claims and their action on these as well as the other questions will be found in detail in the minutes of the session which have been mailed to each local union. The practice of signing annual agreements had increased to such an extent during the last decade that the customs and policies of the organization had been shaped to meet this method of regulating our relations with the jobbing and machinery foundrymen.

"This year the feature of joint trade agreements has assumed a changed aspect in some localities owing to the action of the N. F. A. in presenting propositions which we could not accept if our organization was to be kept intact, and as a result in several foundry centers no agreement for the coming year has been entered into. It was necessary for the executive board to take such action as would protect our members in these districts should the foundrymen endeavor to force unwarranted conditions upon them either through reductions in the wage rate or by the introduction of injurious shop practices. It was the unanimous action of the board that no steps should be taken that would sever the friendly relations that have existed for some time, and that exist today with a large majority of the foundrymen, and should amicable relations be severed in any instance, it will only be as the result of an issue that would be forced upon our members by the foundrymen.

"The discussion which took place relative to the ratio of apprentices at the annual conference held with the S. F. N. D. A. last March, in Chicago, and the recommendations of our conference committed on the question, were laid before the board, and realizing the importance of this question which has been called to our notice from year to year by the S. F. N. D. A. the matter was given much thought, and the merits of the proposition thoroughly investigated before the executive board took action. The foundrymen have from time to time advanced the argument that the interests of both associations would be advanced and protected if an agreement establishing a ratio of apprentices was jointly entered into, that would be observed by both associations. Such an agreement would in their estimation remove the unequal ratios of apprentices that exist today in the foundries under the jurisdiction of their association, and at the same time result in no injury to the I. M. U. as the statistics the foundrymen produced demonstrates that the average ratio of apprentices in the stove foundries which has existed for years and which exists today is much less than 1 to 8. These statistics have been verified by those which were gathered by the officers of the I. M. U. and have therefore been accepted as authentic.

"As the representatives of the S. F. N. D. A. gave our conferees positive assurance that an agreement entered into between the two associations would be observed by all of their members, the board by a unanimous vote decided to recommend to our membership a change in our present ratio of 1 to 8, except in the instance of an agreement with the members of this association, and the board has therefore unanimously requested that it be vested with the authority to enter into an agreement with the S. F. N. D. A. fixing the number of apprentices at a ratio of 1 to 5, the same to apply in all the association foundries. With this end in view a circular will be submitted in due time, calling for a referendum vote of the membership on the question. In the meantime our members are requested to give the question their best thought in order that their votes may represent the results of careful investigation. The facts as they exist should be the sole basis for thought and action on this question, and it should receive a fair and impartial debate in the meetings.

The opinion of the board is that the solution of this question can only be reached by intelligent thought and action, and not by the injection of selfish motives. The time has arrived when this question must be taken up and disposed of according to the desires of the majority, whatever their opinion may be, and we earnestly hope that when the time comes for voting on the question that no member will cast his ballot before all phases of the question have been examined.

BACKBONE OF STRIKE BROKEN.

Between 700 and 800 men are working at the plant of the Dominion Iron & Steel Co., at Sydney, C. B. Since interference on the part of the strikers began the men have been coming back one by one until it looks as if the backbone of the strike has now been broken. The company is making preparations to open as much of the works as necessary for an ordinary output. The work of repairing the coke ovens, which were left half filled and allowed to cool without having been cleaned, has begun. Workmen who have been through strikes at other steel works say they never before knew of such action, the invariable rule being to keep the ovens heated. Such is the extent of the damage that several weeks will lapse before the plant can be put in condition for a good output.

VICTORY FOR THE C. S. BELL CO.

The strike which has been in progress for more than a year in the foundry department of the C. S. Bell Co., Hillsboro, O., has been terminated by a decisive victory for the company. Soon after the strike was inaugurated, the company decided that the only basis on which its officers would talk to any of the former employes concerning employment was with the distinct understanding that they would withdraw from the union and surrender their charter. In addition to this the company requires each man, when he makes application for work, to sign a card stating that he is not a member of any labor organization and will not join any such association while in the employ of the company without giving two weeks' notice of his intention of so doing. For a time the company had only three employes, but now has a force of 52 molders and is melting a little over 12 tons a day. Customers showed much patience and not one of them was lost. The Hillsboro union held a meeting a few days ago and voted to give up its charter. Some of the men at once made application for their old jobs and will be re-employed, but others will not be so fortunate.

LABOR NOTES.

The Bessemer rolling mill of the Tennessee Coal, Iron & Railroad Co. has resumed operations and is being run on the open shop basis.

The Florence mine, which is the chief and practically only industry of Florence., Wis., has resumed operations. The wages of the miners have been reduced five percent.

The long fight made by the labor unions against the Herendeen Mfg. Co., Geneva, N. Y., has been ended and the plant will be operated as an open shop.

Fifty boilermakers at the Norfolk & Western railroad shops, Portsmouth, O., are out on strike. The men quit work because one of their number failed to report for duty on the day following his Fourth of July celebration.

The union boilermakers and iron ship builders of New York have about decided to give up their strike as a lost cause.

Pickets have been removed and there is little or no trouble in any of the shops.

The plants of Zug & Co. and the Pittsburg Forge & Iron Co., Pittsburg, resumed operations in full this week after an idleness of two weeks. All of the independent iron and steel mills in Pittsburg whose employes are affiliated with the Amalgamated Association have already signed the scale.

The Youngstown Iron, Sheet & Tube Co., Youngstown, O., signed the Amalgamated Association scale last week. This concern is one of the largest and most influential members of the Independent Sheet Manufacturers' Association and its action indicates that the independent sheet manufacturers will sign the scale this year and do not intend to break away from the association as was reported. The conference between the American Sheet & Tin Plate Co. and the Amalgamated Association to adjust the tin plate rebate will be held in Pittsburg on Thursday, July 21. If the matter is not settled on this date the mills will close on July 22.

The machinists employed in the plants of the members of the Manufacturers' Association, of Pittsburg, whose wages were cut 10 percent are continuing at work without an agreement and are evidently satisfied to continue work at these reduced wages as long as business is as dull as at present.

The molders employed by the Pittsburg Steel Foundry Co., Glassport, Pa., were notified last week that unless they accepted a reduction of 10 percent the shop would be declared open. The men refused to return to work this week and the plant has been declared an open one. A number of molders have already been secured and the plant will be running as usual in a few weeks, from present indications.

NATIONAL METAL TRADES ASSOCIATION.

The machinists' strike at Chicago is practically won by the employers, who have all the men they need, and there are now just a few odds and ends of places to be filled. The conduct of the strike is demonstrating that the expense of operating a local organization under such conditions is much greater than if it were a part of a national association.

Jack Gallagher, who is charged with assault upon Attorney Allen, counsel for the Chicago machinery manufacturers, is now being tried for wrecking electric work. Evidence shows that the local union of electrical workers had him do the wrecking job and paid him $200 for it. When he was caught they had to defend him. A court clerk was bribed to falsify the records and then they had to defend the court clerk. It is estimated to have cost the Electrical Workers' Union about $10,000 to do the $200 worth of damage.

Lake Superior Charcoal Furnaces.

Under the agreement entered into by the producers of charcoal iron in Michigan and Wisconsin to reduce production one-third in the second, third and fourth quarters of 1904, the operation of Lake Superior charcoal furnaces is now much curtailed. The restriction will turn out to be considerably more than was agreed upon, owing to the large accumulation of iron in makers' hands, stocks on June 30 being estimated at about 150,000 tons. At the beginning of this month the two Marquette furnaces, the Manistique furnace and the Hinkle furnace at Ashland, Wis., were active, and it is now expected that Hinkle furnace will go out at an early date, leaving in operation only three stacks out of the 11 that have been running at some time in the past year. The Wayne and Peninsular furnaces at Detroit, that were operated for about half the first six months of 1904, are not likely to be put in blast again, so that the manufacture of charcoal iron at Detroit may fairly be regarded as an abandoned industry.

A company to manufacture steel cars will be organized in Pittsburg, at the offices of Dodds & Robinson in the Farmers Bank Bldg., on Friday, July 21. The company will be known as the Pittsburg Steel Car Co. and will be capitalized at $1,000,000. A Pennsylvania charter will be applied for on Aug. 4.

The Sterling Foundry Co., of Cincinnati, made an assignment on July 16. The assignee is C. C. Archer. The assets and liabilities are given as $4,000 each. The cause was dull business.

TESTIMONIAL TO ERNEST F. DU BRUL.

Though he has given the association the benefit of his advice, and has been at its headquarters in Cincinnati for a portion of his time this month, Ernest F. Du Brul's connection with the National Metal Trades Association as its commissioner terminated on July 1. The action of the administrative council on Mr. Du Brul's retirement has already been recorded in these columns. As a further expression of esteem and as a testimonial to his ability and the value of his services, the members of the administrative council have presented Mr. Du Brul with a loving cup of beautiful workmanship. From a photograph the accompanying reproduction is made. The cup bears the inscription: "Presented to Ernest Ferdinand Du Brul, by the members of the Administrative Council of the National Metal Trades Association, as a testimonial of esteem and appreciation of his services. July 1, 1904."

Mr. Du Brul, as all know who are familiar with the history of the National Metal Trades Association, has made a notable record in his connection with the association. He had an unusual preparation for the work and had a rare combination of qualities that, without the slightest depreciation of other

LOVING CUP PRESENTED TO E. F. DU BRUL.

talent and other effort, may be credited in a large degree with the advance this progressive and aggressive organization has made in the past two years.

Roeblings will Build Wire Rod Mill.

The John A. Roebling's Sons' Co., Trenton, N. J., has purchased about 200 acres of river front land near Florence, N. J., and contemplates the immediate erection of a wire rod mill upon it. What will be done subsequently has not yet been decided. The only work to be done this year is that of the wire rod mill and the railroad tracks necessary for future extensions.

Representatives of all the great armor making firms of the world are in session this week in London. The Krupp Co., the Bethlehem Steel Co., the Carnegie Steel Co., Charles Cammell & Co. of Birmingham, and many European interests are represented. Charles M. Schwab is among those present. The question under discussion was the rearrangement of royalties, etc., rendered necessary by the Krupp company's latest improvement upon a patent armor process, for which the Krupps, under an agreement with various firms, are already securing royalties.

PRESERVATIVE COATINGS FOR IRON AND STEEL.

At the meeting of the American Society for Testing Materials held at Atlantic City, June 16, 17 and 18 an interesting report was presented on behalf of the committee on Preservative Coatings for Iron and Steel. The members of this committee had been asked to submit their views as to the best methods of testing such coatings, and Chairman W. A. Aiken presented the contributions of several of them. In his preface to these he stated that there was a very general endorsement of the view that service tests should be markedly distinguished from laboratory tests, and that some arrangement should be made if possible to divide preservative coatings in groups for specific purposes rather than to examine every kind with a view to realizing a panacea. The suggestions of Dr. C. B. Dudley, chemist of the Pennsylvania Railroad, Malcolm McNaughton, of the Joseph Dixon Crucible Co., and the International Acheson Graphite Co., of Niagara Falls, N. Y., are given below:

C. B. Dudley, Altoona, Pa.

It is to be confessed, we think, that the test of service is the ultimate test which will prove whether any protective coating is or is not valuable. Experiment as much as we will with exposure tests, and plan them as we will, and continue them as long as we choose, it still remains to actually put the protective material into actual service, and see whether it will give satisfactory results. If a metal structure of any kind is coated with a protective material, and at the end of any designated time it is actually found that the material is not corroded, and is in satisfactory condition, it is evident that such protective material may be regarded as valuable. If not, the verdict will of course be against it.

But experiments with protective coatings in actual service are extremely difficult to make, and are subject to many vicissitudes. Moreover, they require a long period of time before a conclusion can be reaced. If the structure is a permanent one, that is, does not move, the results only apply to the location under which the test is made. If the structure is a movable one, such for example as a steel car, there are very serious difficulties introduced into the test, due to the almost impossibility of watching the car while it is in service, and to the danger of losing track of it before the test is completed. Cars are constantly undergoing repair, a part of which is freqeunt repainting, and unless some one keeps constant watch over the cars under test, results are frequently lost, due to this cause. Also cars are frequently smashed in wrecks, and in this way tests are lost, so that, taken as a whole, while the test of service is undoubtedly the best and the ultimate one, as already stated, it is only with the greatest possible difficulty that a service test can be obtained.

In view of this difficulty, exposure tests on smaller samples have been proposed. Coat, for example, a number of pieces of metal with the various protective coatings which it is desired to test, and expose them for a period of time. Unfortunately such tests have not a few serious difficulties connected with them. It is undoubted that valuable information can be obtained from exposure tests, but these tests have at least four objections to them: (1) The samples are usually small, and small samples do not quite afford the same opportunity to get the proper amount of coating on them, as if the samples were larger. Moreover, the casting is usually done under more favorable conditions, than apply in actual service. Also, there seems to be a fairly well grounded belief that panel tests, as they are called, are not sufficiently like the actual conditions of service to warrant final conclusions. (2) During exposure tests there is always the uncertainty as to whether something will not happen to the test samples, such for example as the record being lost, or the samples being injured in some way, or somebody not conversant with the conditions interfering with them. We have actually had panel exposure tests within sight of our laboratory, where they were under constant almost daily observation, mixed up, and some of them lost, due to repairs to buildings, or places where the material was exposed. (3) Exposure tests take a long time, and this long time is not infrequently accompanied with changes in the personnel of those having charge of the test, with a forgetfulness as to exactly what was done with the various samples, and sometimes unfortunately with loss of interest in the test. (4) Probably, however, the most valid criticism of exposure tests on panels or small samples is that the conditions are not those of actual service. The samples are located at one place with a certain exposure. This exposure is not the exposure which structures actually get. Furthermore, the small panels are not under strain, which is characteristic of almost every metal structure in actual service, and whatever deterioration may be due to strains does not appear in the exposure tests. We are not trying to demonstrate or prove that exposure tests are not valuable and do not give some indications at least which may be of service. But we do believe that in order that exposure tests on panels may be really valuable, they should be much more elaborate, and much more carefully watched, than any exposure tests which we have ever known of heretofore.

In view of the difficulties connected with either service tests or exposure tests of protective coatings, it has occurred to us to attack the problem in a little different way, namely, to ask ourselves what the protective coating is required to exclude from the surface of the metal, and if this can be found, to test protective coatings as to their ability to exclude this objectionable material. It is evident that this brings up the question of the theory of corrosion or rusting of iron and steel, and while it may not be possible at the present time to say the last word on this subject, we cannot help feeling that if a protective coating keeps out water in every form, there will be no corrosion. It is on this thesis that what follows is based. If this is not true, our reasoning and suggestions must be regarded as fallacious. If it is true, we think what follows has some value.

Starting then with the statement that if water can be kept out there will be no corrosion, let us inquire in what forms water may get at the surface. It is obvious that there are two sources from which water may come; first, from the rainfall or other exposure; and second, from condensation of moisture from the atmosphere. The successful protective coating, if we are right, must exclude from the metal water falling on the surface during the rains or water that condenses when the dew-point is reached.

This brings us to the question whether there is any test which will determine whether water permeates paints or other materials designed to be used as protective coatings. We have spent quite a little time trying to devise a test of this kind. Our first thought was to put on glass or other transparent non-absorbent surface, some substance which would change color when water gets to it, and after the gum holding the material had been dried out thoroughly, coat it with paint or other protective coating, and then put the painted object into water. Experiments with anhydrous sulphate of copper and other materials which change color when water gets to them, proved not very satisfactory. Apparently during the drying of paints, of which linseed oil is a constituent, water is formed in the layer itself, due to the chemical action. At least our experiments showed some blueing of the anhydrous sulphate of copper, even before the specimen had been put in water. The most successful results which we have obtained in our attempt to test whether water permeates a layer of paint or other protective coating, have been by using a water solution of dextrine. Dextrine can be completely dissolved in water, so as to give a uniform smooth layer, such as appears for example on the back of a postage stamp. This layer when applied moderately thick has a little tendency to peel when drying. The addition of a little ordinary alcohol seems to overcome this tendency. A good working formula is 20 grammes of dextrine, 40 cubic centimeters of water, and 30 cubic centimeters of alcohol. In spreading, it is desirable to have the layer as thin as convenient, and allow it to dry out without heat for ten to twenty minutes. In heating it is not desirable to exceed 150° F. Such material applied to a portion of a piece of glass for example, and then dried out thoroughly, using heat if necessary, gives a thin layer on the surface. If now the whole piece of glass is coated with a paint or protective coating, and it is allowed to dry, and followed by another or a third coat if desired, the whole being allowed to dry and harden for a period of time, we have as the result an object which, when plunged in water, gives apparently a very satisfactory test as to whether water gets through the

layer. We have made a number of such tests, and have found to our astonishment that almost no paint containing linseed oil as a constituent, is impervious to water. It is obvious when the coated glass is put into water and allowed to stand, perhaps over night, if water gets through the layer, it will soften the dextrine and cause the material over it to peel. Moreover, a layer of dextrine prepared as above, is almost completely transparent and invisible on the glass after it is dried. But when water gets to it, there is a little change in appearance, making the spot quite visible. This change in appearance and peeling of the coat of paint is the common result with most paints which we have tried, which contain linseed oil. It has been our custom to put the dextrine on in the form of a spot about 1½ inches in diameter, and we have not a few painted glasses where the dextrine covered spot is bare, the rest of the glass still retaining the paint which was put on. The test is new and we have not yet had opportunity to exploit it as far as we would like. It is obvious the glass must be free from grease when coated with dextrine.

There are still some uncertainties in the tests. For example, it is well known that a linseed oil paint does not reach its final state of oxidation, or the change which we call drying, for quite a period of time. We have not yet made any tests, where the paint layer was allowed to harden for more than ten days or two weeks. It is possible that a longer time before the paint was tested would prove advantageous, and there is considerable indication that such would be the case. There are indications still further that the presence of pigment very greatly helps the linseed oil to resist the penetration of water, and also a good deal of evidence that the fineness of the pigment is a most important element in the water resistance of the layer. Furthermore, the nature of the pigment seems to be an element likewise in the problem.

The query may arise, why is it or how it happens that a layer of paint made with linseed oil should allow water to get through it? It seems almost incredible that an oily substance spread out in a thin layer should not so completely repel water that there would be no permeation of the layer. But it must be remembered that dried linseed oil is no longer an oil. The mass of dried linseed oil, if we may trust Mulder's researches, is a tough leathery sort of material, which does not leave an oily stain when touched, and which is changed chemically from being an oil into a material which Mulder calls "linoxyn." During the drying or the change of the oil to linoxyn, there seems little doubt but that oxygen is absorbed and carbonic acid at least is given off; but if carbonic acid is given off as fast as it is formed, it must escape, and it must escape not only from the outer surface of the layer of paint, but also deeper down in the layer, and it is believed that this escape of the carbonic acid, it being a gas, leaves apertures in the dried layer, through which apertures the water passes when the material is tested, as has already been described. Whatever the philosophic explanation of the porosity of the layer of dried linseed oil paint may be, if our experiments are to be trusted, this porosity is a universal characteristic at least of the layer two weeks old.

It would perhaps be too strong a statement to make without limitation, but we cannot help feeling that our experiments seem to indicate that it is going to be difficult, not to say impossible, to make a perfectly water-resistant protective coating out of a material which consists largely of linseed oil. Substances brought forward as protective coatings which dry by evaporation of the solvent, seem to offer much more prospect of success.

It will hardly be fitting at this time, and in this state of our knowledge of the case, to discuss methods which have been suggested to make the layer of paint impervious to water, such, for example, as mixing with the paint an oil which does not undergo chemical change, but remains an oil in the paint layer, the philosophy being that finely divided pellicles of oil would help to repel moisture; also the dusting over the paint just before it gets completely dry, with finely divided pigment, the idea being to fill in all the little pores or interstices which may be left as the result of the operation of drying, or again the subjecting the painted object to a temperature sufficiently to soften the layer, so that the pores, if any there be, would close up as is done in the well-known operation of enameling. Our thought in this whole matter has been, if we had some test that was completely reliable, to tell whether any material suggested or offered as a protective coating did actually prevent water from reaching the metal layer underneath, it would be a decided step forward in our study of this interesting problem. It is not hoped or expected that the test suggested above will be final. At present it is the best test that we know how to suggest, and it is hoped that further study along this line, by anyone interested, may result in either improvements in the test suggested, or the development of something better. Finally it is not hoped or expected that a test which enables us to say that any given protective coating actually prevents water from reaching the material, will enable us to say that such protective coating will be satisfactory in service. Of course exposure tests to get the influence of the sun, and to study durability under actual conditions, are still essential. But it is believed that no protective coating will be a satisfactory one, that does not keep out water, and that every successful protective coating must pass the test suggested, or some modification of it. If our reasoning is correct, we have got to begin at this point; and if our experiments are to be trusted, the protective coatings at present available are not as valuable as we have been hoping.

International Acheson Graphite Co.

We have recently made, and almost completed, a series of 10 tests on about 40 paints;4 of these tests being in the nature of long-time durability tests, the other 6 rapid chemical or physical tests. All tests were made in duplicate on surfaces painted with two coats.

The long-time tests included (1) an exposure test, painted strips of sheet iron being placed on the roof of one of the factory buildings; (2) an evaporation test, in which shallow iron pans were partly filled with tap water and allowed to stand uncovered, the loss due to evaporation being made up from time to time; (3) a weak acid test, which was much the same as that last mentioned, except that 1 percent sulphuric acid solution was used instead of water; (4) a brine test, a strong brine solution being allowed to drip slowly upon painted sheet iron strips arranged one above the other so as to drip from the lower end of one strip on to the upper end of the strip next below.

The accelerated tests consisted in treating the coatings (1) with a 2 percent solution of sodium hypochlorite; (2) with nitric acid (specific gravity 1.2); (3) with "red" lubricating oil; in testing permeability and water-repellant properties by placing a few drops of water on the coatings and noting the action and, finally, in testing the hardness of a coating and in making a qualitative analysis of the paint.

As a result of these tests, and of the discussion at the recent meeting of the committee in Washington, we should recommend that a test for porosity of coatings be included, and we are making a number of experiments for the purpose of devising such a test. The method which at present seems most hopeful is that of applying the paints to polished marble slabs, immersing these in dilute hydrochloric acid for a certain length of time and noting any action on the marble after removing the coating, shown either, qualitatively, by a roughening of the polished surfaces or, quantitatively, by the loss of weight of the slabs.

As regards the tests proposed by Mr. Sabin for determining the insulating power and porosity of a coating by subjecting it to a high voltage both when dry and after soaking in water, it seems to us that the nature of the pigment used, as well as that of the vehicle, would so largely influence such tests as to make comparative porosity determinations impracticable.

Joseph Dixon Crucible Co., by Malcolm McNaughton.

In outlining a test scheme for protective paints, the following points are to be considered: cost, application, drying, adhesion, elasticity, porosity, resistance to mechanical injury, permanency.

1. Cost. This point may or may not be included in a scheme for testing paints. It is properly included when the test is made by the person who is directly interested in the economic side of the question, and may properly be left out by him who has to determine only the value of the paint as a protective coating.

2. Application. This bears on the facility with which the coat may be applied, whether it may be properly applied over other and different coatings, whether it may be applied at all ordinary temperatures, and whether or not any special treat-

ment of the surfaces is required. Knowledge on these points is only to be had by actual trials.

3. Drying. Continued observation during an actual trial will give all the information necessary on this point. But it is necessary that observations be made up to the time that the paints are actually hard and dry, because it may happen that one paint may begin to dry on the outside more rapidly than another which may finally pass it and become dry first.

4. Adhesion. This is a most important point, it being self-evident that any paint to protect must stay in place. Relative adhesion, when decidedly unlike, may be detected when the paints are fresh by simply peeling off at the point of a chisel. But adhesion must persist throughout the life of the paint, so that it becomes necessary to test the paint films after having given them somewhat the effect of age. Probably as fair a way as any, to secure this effect, is to subject plates of painted iron or tin to repeated alternations of heat and moisture. Tests for adhesion should be made before any others, as a paint coat which lacks this quality, when new, should be immediately condemned.

5. Elasticity. This quality enables a paint film to accommodate itself to its base during changes as a result of variations of temperature or form. When we consider the great difference in the coefficient of expansion between the metals and oils, we see that, unless there is a certain degree of elasticity, rupture of the paint film must occur. Films of the paint, detached from their support, are best for determining relative elasticity. The simple test of bending is enough to give information where the difference in elasticity is enough to be of importance.

6. Porosity. Since iron does not rust except in the presence of moisture, it is important that the protecting film of paint should be non-porous in the highest degree, without the sacrifice of other desirable qualities. This is a test which should be applied when the paint is in its most perfect condition as a protecting film. It is not correct to test by repeated evaporations of water in a painted dish, because the deterioration of the paint by these repeated evaporations is also involved. The method in which postage stamps painted on glass, covered with a couple of coats of paint, and when dry, immersed in water, seems good. This may not be exactly correct in its technical aspect, but should give approximately correct results when made for comparative purposes.

7. Resistance to Mechanical Injury. Test to determine this need be made only in special instances where conditions are such that protective coverings may fail from this course. Where such a test is advisable, it is easily made by allowing a stream of sharp sand to flow over the painted surfaces from a hopper, the sand being returned from time to time. The test is easily made more or less severe by varying the height of fall and angle at which the stream strikes the plate.

8. Permanency. Protective coatings may be assured as quickly reaching their condition of greatest efficiency. We may consider that when a paint has become what we call dry, it has reached that condition. From that point of greatest efficiency there is a gradual, more or less rapid progression toward ultimate failure. The paint in which this progression is slowest is to be taken as the most permanent. The value of this function must be determined entirely separate from the determinations of the other qualities, and the test should be so conducted as to bring about a slow change, rather than to destroy. The test should be made with especial reference to the conditions under which the paint is to be used. The test should be made with paint films which have been detached from their support. They should be of sufficient thickness, not less than two coats, and probably three would be better. They may be prepared on thin zinc plates, the zinc being dissolved off by dilute sulphuric acid, or they may be prepared on cardboard covered with a paste of dextrine. When dry the whole is immersed in water and the support soaked until it may be separated from the film. Films of various paints to be compared are subjected to the same set of conditions and their relative action observed. It is much easier to detect changes in films separated in this way than when attached to their supports.

The foregoing tests, while simple, and probably capable of much improvement, are sufficient to give considerable information when made carefully for comparative purposes, yet at the same time they do not give exact values. Under any one test in question, it will be easy to show that one paint is better than another, but not so easy to show just how much better. Judgment in this matter can only come with experience. It is to be supposed that any test of paints is for the purpose of selecting the one most suitable for some set of actual conditions, and that these actual conditions indicate the relative importance of the tests to be made.

The rate of drying, resistance to mechanical injury, porosity, adhesion, etc., may each in turn be the feature of greatest importance. It would certainly be an absurdity to lay much stress on relative porosity of a coating which is to be applied to bridges in Arizona, or to pay much attention to the matter of elasticity in a paint for iron work in a damp subcellar. Unfortunately, no paint has yet been discovered which possesses pre-eminently all the qualities needed for iron and steel protection, so it becomes necessary for us, if we hope to get best results, to determine in some way what particular product is at least as good as any other for the case in hand. Our tests may not always indicate the very best, but they will undoubtedly put aside the very worst, and this result alone will be a great gain. It seems to be entirely within the scope of this committee, in addition to suggesting methods of making tests, to suggest also a scheme for combining the values obtained by such tests, into an equation, the solution of which will give relative values in particular cases. For instance, the efficiency of a coating may be represented by an equation where one side consists of the sum of the values for the various functions previously determined by experiment, each multiplied by a factor which represents its particular importance in any specified case. Thus in different cases we may take the factors as follows:

Cost 1	Cost 1	Cost 1
Application 1	Application 1	Application 1
Drying 4	Drying 1	Drying 1
Adhesion 2	Adhesion 1	Adhesion 1
Elasticity 1	Elasticity 1	Elasticity 1
Porosity 2	Porosity 1	Porosity 10
Resistance to Mechanical Injury 3	Resistance to Mechanical Injury 1	Resistance to Mechanical Injury 1
Permanency 2	Permanency 6	Permanency 1

The first set may be used in testing paints for steel cars, the second for highway bridges, and the third for ironwork in locations subjected to steam and acid vapors. Such a scheme will have its limitations and variations due to the personal equation of the man operating it, but eventually there would come a certain degree of standardization. These suggestions are presented with the idea of showing the advisability of a scheme which will necessitate the consideration of all the points involved.

With regard to time tests, not much need be said except that the pieces to be exposed should have at least 2 square feet of area on each side, and should have two coats, the second applied only when the first is dry. The second coat should be dry before exposure occurs, and the exposure should be average conditions it is desired to protect against. The test piece should consist of vertical and horizontal parts, the latter to serve as a resting place for water, cinders, dust, etc. Where such pieces have been examined from time to time, such places should be covered by paint to prevent extension of corrosion from the damaged surfaces. This patching-up paint should be of a different color than the paint which is being tested, to avoid any confusion.

The stockholders of the Morse Iron Works, recently organized at Erie, Pa., have elected the following directors: Thos. G. Morse, Frank H. Payne, Fred Koehler, A. W. Walker, C. M. Conrad, Edward Roach, Robt. J. Saltsman, E. A. Kohlmiller, J. M. Sherwin; and the board of directors at a later meeting elected Frank H. Payne, president, and Thos. G. Morse vice president.

Arthur Koppel, manufacturer of industrial, narrow and standard gauge railway materials, of 66-68 Broad street, New York, has an exhibit of track switches, turn tables and cars of various styles in the Mines and Metallurgy Building, block 20, assignment 10, at the St. Louis World's Fair.

The property of the United States Steel Co. of Everett, Mass., was sold July 16 at public auction for $10,000 to the bondholders of the company by the International Trust Co. It is understood that the company will be reorganized. The plant has been closed for some time.

RAPID CHANGE GEAR FOR LATHES.

A new rapid change gear device for lathes for feed and screw cutting has been adopted after thorough tests by the New Haven Mfg. Co., of New Haven, Conn. The arrangement to be first described applies to lathes of 32 in swing and larger and is illustrated in Figs. 1, 2, 3 and

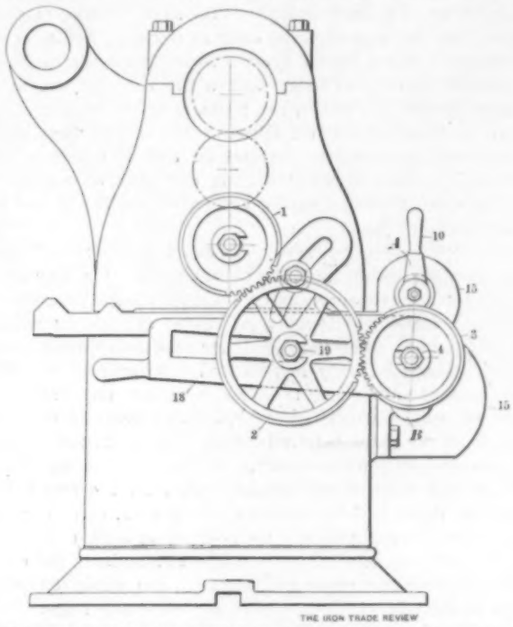

FIG. 1.—END ELEVATION OF HEAD AND CHANGE GEAR ARRANGEMENT.

5. At 1 in Fig. 1 is shown a change gear mounted on the head shaft and driven from a spindle. At 2 is an intermediate or idler gear mounted on a stud in the stud plate; 3 is a change gear mounted on the shaft 4. To this shaft is keyed the bevel pinion 5 (Figs. 2 and 3), which meshes with the bevel pinion 6. The latter is keyed to the quill 7, which is mounted on the shaft 8, and to the shaft are keyed the eccentrics 9, 9. By turning these

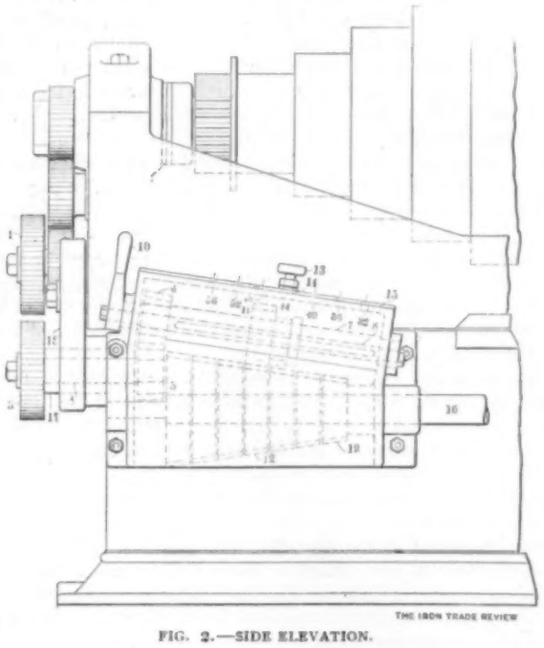

FIG. 2.—SIDE ELEVATION.

eccentrics and the shaft by means of the lever 10, which is also keyed to the shaft 8, the sliding pinion 11 is engaged or disengaged with any one of the gears 12, mounted on the lead screw 16.

The sliding pinion 11 is moved longitudinally to the position indicated by the index plate, by means of a knob 13, and after being engaged with the desired gear is held in position by the pin 14, which enters a suitable hole in the gear cover 15, marked with the number of teeth in the gear with which the sliding pinion has engaged. This pin also prevents the pinion 11 from being engaged with any of the gears 12 till placed in its exact position to mesh properly with the desired gear 12.

On the front end of the gear box 15 is the hub 17 on

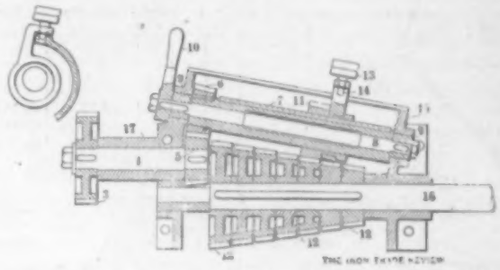

FIG. 3.—SECTION THROUGH GEARS AND ECCENTRIC MECHANISM, A-B.

which is mounted the stud plate 18. The gears are so arranged that threads from 2 to 14 per inch may be cut, or feeds from 8 to 56 per inch obtained, without changing the position of the stud 19, but simply by loosing nuts on the stud, and the shaft 4 (which are provided with open washers) and removing the gears, placing on the

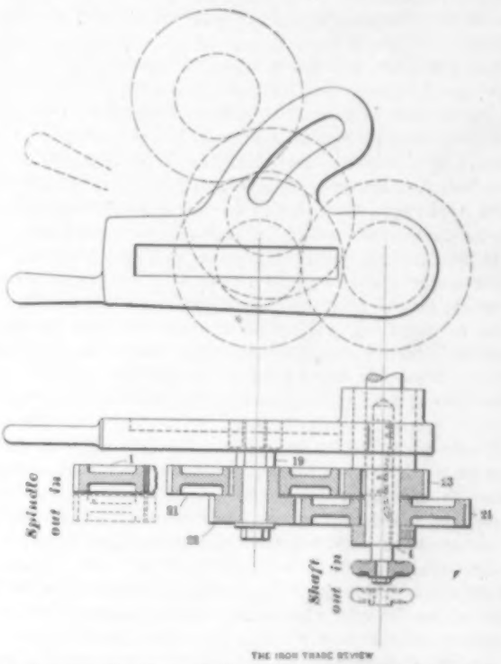

FIG. 4.—SECTION SHOWING ARRANGEMENT FOR FOUR INSTANTANEOUS FEED CHANGES ON END OF HEAD.

shaft 4 the gear indicated by the index plate, and using the gear just removed from shaft 4 for an intermediate on the stud 19, thus obviating the necessity of moving or adjusting this stud. Gears can be furnished and readily adjusted for any desired thread or feed, while the rapid change gear device is of sufficiently wide range to provide

Spindle	Shaft		Knob at Hole							Feeds per in.
			32	36	40	44	48	52	56	
96	24	Th's per in.	½	7/8	¾	1 1/4	1	1 1/4	1 1/2	2 to 3½
48	24	" " "	1	1 1/4	1	1 1/2	1 1/2	1 3/4	2	4 " 7
48	48	" " "	2	2 1/4	2½	2 3/4	3	3 1/4	3½	8 " 14
48	96	" " "	4	4½	5	5½	6	6½	7	16 " 28
24	96	" " "	8	9	10	11	12	13	14	32 " 56
21	69	" " "							11½	

FIG. 5—INDEX PLATE FOR LATHES OF 32 IN. SWING AND LARGER.

for all regular threads or feeds as is shown by the index plate, Fig. 5.

On lathes of from 18 in. to 28 in. swing, inclusive, the same change gear arrangement is used, excepting that four additional instantaneous changes are provided by gearing on the end of the head, as shown in Figs. 4 and 5.

At 1 (Fig. 4) is the change gear on the head shaft, while 21 and 22 are compound gears mounted on the stud 19. The gear 1 moves longitudinally so as to engage with the gear 21 or 22. The gears 23 and 24 are mounted on the shaft 4 which is provided with a sliding spring key so as to engage with the desired gear as indicated by the index plate, Fig. 6, thus giving a range of from 1 to 15

Spindle	Shaft		Knob at Hole							Feeds per in.
			32	36	40	44	48	52	56	60	
48-out	in	Th's per in.	1	1¼	1½	1⅝	1¾	1⅞	2	2¼	4 to 7½
48-in	in	" " "	2	2½	2¾	3	3¼	3½	3¾	4	8 " 15
48-out	out	" " "	4	4½	5	5½	6	6½	7	7½	16 " 30
48-in	out	" " "	8	9	10	11	12	13	14	15	32 " 60
24-in	out	" " "	16	18	20	22	24	26	28	30	64 " 120
24-in	69-out	" " "	11¼								

FIG. 6—INDEX PLATE FOR LATHES OF FROM 18 IN. TO 28 IN. SWING.

threads per inch, or feeds of from 4 to 60 per inch without removing a gear; and by replacing gear 1 by a smaller gear, from 16 to 30 threads per inch may be cut, or feeds from 64 to 120 per inch obtained (see Fig. 6), and any desired feed or thread may be obtained by using the necessary gears on either the head shaft or the shaft 4.

CARBORUNDUM FIRESAND.

BY T. J. TONE.

In all metallurgical operations the question of refractory material is of special importance. In some processes, due to the frequent renewal of the portions of the structure required to withstand intense heat, this constitutes by far the largest item in the cost of operation, and it is therefore a question in which all furnace owners are vitally interested. The proper selection of refractory material, and improvements in the methods of manufacture, are now receiving more scientific attention than ever, but viewed in the most favorable light, progress cannot be said to be rapid. The metallurgist can hardly hope that the perfect refractory will ever be discovered. Such a material should resist the most intense heat without fusion. It should resist all furnace atmospheres, whether reducing or oxidizing. When in contact with the charge, it should withstand the action of various fused substances and scouring slags. It should have mechanical strength, and should not expand or contract unduly in heating or cooling. It should, in fact, be chemically inert and passive in the presence of all substances at all temperatures. In the want of such a substance, it therefore becomes necessary for the metallurgist to make a careful study of the special requirements of his process, and to select from the many substances which nature and science have provided, those which the least imperfectly suit the working condition.

In this connection it is interesting to note some of the special properties of carborundum firesand, and a refractory material of comparatively recent application and of growing importance. Carborundum firesand is an electric furnace product formed at a temperature of between 6,000 and 7,000 degrees Fahrenheit. It is derived from two of the most refractory materials known to the metallurgist, being chemically a compound of carbon with incompletely reduced silica. Although always carrying a certain proportion of free silica, it should be classed with the neutral refractory materials. Among its physical properties, it may be noted that it has a specific gravity of 2.7, is of grayish green color, granular, easily crushed, and of low heat conductivity.

One of the most successful applications of carborundum firesand, and one of special interest to the foundryman, is its use in the construction of brass furnaces. In the various types of tilting and rotary melting furnaces, now being so extensively introduced among brass founders, the question of linings is very important. Oil fuel has superseded coal or coke, the working temperature is considerably increased, and a corresponding improvement in the refractivty of the lining must be obtained. Unless a lining can be produced which has long life and can be easily renewed, all advantages over the old crucible type of furnace in the matter of fuel consumption and increased weight of charge entirely disappear. A magnesite or chromite lining softens under this extreme temperature. No fire brick has been found to give satisfactory results, although silica brick has been applied with some success. The most exacting conditions, however, in the matter of resistance to the high temperature of the oil flame and the scouring action of copper and brass slags are fulfilled by the use of carborundum firesand. We have here a material by use of which the entire lining may be rammed up in a solid block, having no joints and presenting a smooth glazed surface of good mechanical strength and great refractivity.

In any furnace structure built of fire brick, the weakest points are often at the joints. It is the usual practice to make joints of fire brick as thin and close as possible; but, with the greatest care, these always present to the flame spaces where the volatile fluxes can lodge, and where the slag can scour its way between the bricks, the ultimate result being that the bricks are loosened and the lining destroyed. A most useful property of carborundum firesand is, that it unites readily with various binding materials. It can thus be molded in place in a solid mass, avoiding special shaped bricks and the weak feature of joints.

The binder most commonly employed is silicate of soda. This is diluted with water to a thin syrup of a density of about 33 degrees Beaume, and a mixture formed of about 90 parts of firesand and 10 parts of silicon of soda by weight. The constituents, when thoroughly incorporated, form a plastic mixture, which is easily molded and has sufficient cohesion, when tamped into place, to retain its shape until fired. A center of iron or wood is provided, the dimensions of which conform to the shape required for the interior of the furnace. The firesand mixture is rammed solidly between the center and the iron shell of the furnace, and after the removal of center the lining is dried out with a slow wood fire. The furnace is then brought slowly up to working heat, and can at once be put into service. This method of molding the entire lining in place has many advantages. The weak feature of joints is entirely avoided. There are no costly shape bricks required, and it is possible, moreover, to obtain the irregular curved surfaces, which are required for the proper deflection of the flame, for the oil ports and for all orifices.

A further and very important factor is that carborundum firesand has low heat conductivity. While this would be a disadvantage in a material composing a crucible or a muffle, it is of the highest value in a lining of a receptacle serving at the same time as the combustion chamber and the containing vessel for the molten metal. This is well illustrated by the experience of a well known manufacturer of tilting furnaces. With fire brick linings first employed, it was possible to obtain from five to six heats per day. With the first trials of carborundum firesand nine to ten heats were easily run and he expects to reach a still higher efficiency. The exterior of the furnace is cool enough to rest one's hand on the shell, and the plain inference is that the refractory we are discussing is an exceptionally good insulator of heat.

In making up linings for the ordinary type of crucible brass furnace, the mixture consists of 85 percent firesand, 10 percent silicate of soda, and 5 percent of No. 1 fire clay. A sheet iron form is provided of the same diameter as the interior of the furnace, and the mixture is rammed up between the center and the shell. This lining will last indefinitely without replacement. It requires, moreover, no skilled labor or special brick in its construction, and when worn can be patched and renewed with the original mixture.

A very useful mortar can be made from carborundum firesand by mixing with it from 30 to 50 percent of No. 1 fire clay. For such purpose a raw New Jersey clay or kaolin will be found well adapted. The mortar is used in laying up fire brick, in patching up holes or joints which have been scoured out, and for general repair work. When thinned down with water, it can be used as a wash or paint on the face of the fire brick, protecting them from the action of the fuel and the heated gases. When applied in this way to the silica lining of a Schwartz furnace, the application being made daily, or two or three times weekly, it has been found possible to obtain a life of 1,000 heats without relining.

In conclusion it may be said that the use of this new refractory is not limited to the applications just described. Experiments are under way which promise that its sphere of usefulness will soon be widely extended.

Edmond L. Pollock, proprietor of iron works at 2343 Old Broadway, New York, has filed a petition in bankruptcy with liabilities $28,862 and nominal assets $29,420, consisting of machinery and plant.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The National Loose Pulley Co., Chicago, has been incorporated with a capital of $20,000, to manufacture machinery. Incorporators are: W. T. Richards, Morris Frisch, and Joseph Loeb.

The C. D. Pruden Co., Baltimore, Md., has been incorporated with a capital of $100,000, to manufacture architectural sheet-metal. Incorporators are: Clarence D. Pruden, George Norbury Mackenzie, John S. Bridges, Graeme Turnbull and Frank C. Bolton.

Frank Simmons and Dwight Curtenius have organized a company at Kalamazoo, Mich. with a capital of $10,000, to engage in the foundry business. It has not been decided whether a building will be rented or a new one erected.

The Edwards Mfg. Co., Augusta, Me., will soon equip a machine shop 60 x 100 ft.

The Meade Roofing & Cornice Co., Philadelphia, Pa., is in the market for three electric motors, gas soldering fire pot system, gas forges and two small circular saws for wood work.

The Adrian Steel Casting Co., Adrian, Mich., has been incorporated with a capital of $30,000.

The Waterloo Automatic Stone Machine Co., Waterloo, Ia., has been formed to manufacture machines for making artificial stone.

The Chanute Iron Works Co., Chanute, Kas., has been incorporated with a capital of $35,000.

The American Turbine Engine Co., Yarmouth, Me., has been incorporated with a capital of $1,000,000. Officers are: President, M. S. Watts, New York; treasurer, C. L. Marston, Portland.

The W. G Rowell Brass Foundry & Mfg. Co., of Bridgeport, Conn., has been incorporated with a capital stock of $50,000 for the purpose of doing a general foundry business. The incorporators are: D. W. Rowell, W. G. Rowell, and F. S. Hughes.

The Empire Foundry Co., of Lancaster, Pa., has been incorporated with a capital of $13,700.

The San Jose Brass & Iron Foundry, of San Jose, Cal., has been incorporated with a capital of $25,000. It expects to carry on a general iron and brass foundry and machine shop, and to manufacture implements, engines, electrical appliances, etc. The incorporators are: H. I. Howland, Orlin Wait, P. C. Doak, George Hanson and P. Bolan.

Sealed proposals will be received at the office of the supervising architect, Washington until 3 o'clock p. m. on Aug. 3, and then opened, for the construction of new mechanical equipment and fixtures in, and remodeling of the laboratory of the supervising architect in the United States Treasury Building, Washington, D. C.

The Sheet Metal Co., Tiffin, O., has been incorporated with a capital of $500. Incorporators are: A. C. Vankirk, N. O. Vankirk, H. B. Gibbon, G. M. Hoke and A. L. Gibbon.

The Lawrence Machine Co., Boston, Mass., has been incorporated with a capital of $10,000. Officers are: President, G. F. Ramponni, 1433 Washington street, Boston; treasurer, William H. O'Neill, 137 Pine street, Pawtucket, R. I.; clerk, Chester F. Hill, 1864 Washington street, Boston.

The Illinois Foundry & Engineering Co., Granite City, Ill., has been incorporated with a capital of $25,000, to manufacture iron and steel. Incorporators are: E. M. Miller, Arthur W. Price and A. J. Miller.

Specifications for a large number of machine tools to be purchased by the Philadelphia & Reading railroad have just been issued and bids are now being prepared by the trade. The tools required are valued at $100,000.

The Pennsylvania Railroad Co. has just issued a list of machine tools to be installed in its shops at various points. Many of the tools are to be used in its new shops in Olean, N. Y.

The General Electric Co. will soon issue a call for bids on equipment to be used in its new turbine shops.

Extensive purchases are being made by the Canadian Westinghouse Co. for the equipment of its plant in Hamilton, Ont. One of the machine tool orders placed calls for 20 milling machines to be built by the Cincinnati Milling Machine Co.

A large locomotive plant is to be built in the vicinity of Yokohama by a new concern called the Anglo-Japanese Locomotive & Engineering Co., Ltd. It is expected that a part of the equipment, especially the heavy tools, will be purchased in the United States.

The American Automatic Can Co. has been organized at Newcastle, Pa., with a capital of $50,000 and will erect a plant for the purpose of manufacturing all kinds of sheet steel novelties. The directors of the company are: George Greer, Chas. Greer, A. J. Breckenridge, G. M. Sharp and Frank A. Hover.

The Bessemer Foundry Co., Grove City, Pa., has applied for a Pennsylvania charter. The company was originally incorporated under the laws of Delaware with a capital of $12,000.

The McNaughton-Bassett Co. has been organized at Ottawa, Ill., to manufacture gasoline engines. A building has been rented.

Fires and Accidents:—

The entire plant of the Forest City Bedstead Co., Cleveland, manufacturer of iron and brass bedsteads, was destroyed by fire July 16, causing a loss estimated at $100,000, a part of which is covered by insurance.

New Construction:—

The Enterprise Iron Works Co., Ltd., of Alexandria, La., is building a new machine shop, foundry, pattern shop and blacksmith shop.

The Nansell-Elcock Co., of New York, will build a new foundry at Butter and Archer streets.

The old foundry of the Standard Machinery Co., of Mystic, Conn., is being demolished and a new brick building to be used as a foundry will be erected on the same site.

The Southern Steel Works, Chattanooga, Tenn., has commenced excavations for its new foundry addition, which will be 79 x 120 ft. The best equipment obtainable is to be installed. This company was established in 1883 and has been very successful.

The Pennsylvania Railroad Co. will spend about $150,000 in erecting new shops at Olean, N. Y.

The work of construction on the shops of the Trinity & Brazos Valley railroad, at Cleburne, Tex., has been begun. The Santa Fe shops at this place, recently destroyed by fire, will be rebuilt.

The Concrete Machinery Co., Fenton, Mich., will erect a plant 40 x 100 ft., two stories. The building will be of cement bricks and concrete blocks, which materials will be made by the machinery manufactured by that company.

The capital stock of the Standard Roller Bearing Co., of Philadelphia, has been increased from $1,000,000 to $2,000,000. With $250,000 of the new capital, the company proposes to erect a new machine shop which will be devoted exclusively to the manufacture of roller bearings, while another addition will be made to the ball plant.

The Ashland Steel & Mfg. Co., Ashland, O., will build an addition 75 x 60 ft. to its present foundry. The company has had a very prosperous career.

The Geiser Mfg. Co., Springfield, Mo., is building a large warehouse in that city. It has no plans at present for manufacturing, but may engage in it in the course of a year or so. The company has a plat of ground 125 x 300 ft. The warehouse will be the largest in Southwestern Missouri.

General Industrial Notes:—

The Alert Pipe & Supply Co., Bay City, Mich., has purchased a new building at Fourth avenue and Water street, where it will have much better facilities for its manufacturing business.

The plant of the Empire Coke Co. at Geneva, N. Y., has started operations. The company was organized a year ago with nearly $1,000,000 capital and has a large plant covering three acres. Arrangements have been made to dispose of the by-products and gas will be furnished to surrounding towns. A pipe line has been laid from the works through Geneva, Waterloo, Seneca Falls and Auburn. The separate gas plants

The Graham Nut Co., Allegheny, Pa., is moving its plant to the new site on Neville Island, comprising eight acres.

in these cities will be discontinued and the consumers will be supplied by the Empire Coke Co.

C. Davis & Co., Pittsburg, dealers in iron and steel scrap, have just erected power cranes in their storage yards for unloading and loading heavy material, have also completed iron clad buildings for storing such material as needs to be kept out of the weather and have finished other improvements which enable them to handle all kinds of material for storing at the lowest possible cost.

The Wellman-Seaver-Morgan Co., Cleveland, has secured a contract from the government to make 25 6-inch disappearing gun carriages. A Mansfield concern had the contract originally, but became bankrupt and was unable to carry it out.

The Gem City Boiler Co., Dayton, O., will erect a new plant on land recently purchased. It is expected that the buildings will be completed by Oct. 1.

The Rockaway Rolling Mill Co., recently incorporated with a capital of $100,000, has purchased the plant of the Rockaway Iron & Steel Co., Rockaway, N. J. The business will be continued as heretofore.

The two mill sheet plant of the Huntington Tin & Planished Plate Co. will be removed from Huntington, W. Va., to Myersdale, Pa. The plant will be operated by the Meyersdale Sheet Steel Co., which has been incorporated with a capital of $50,000.

Walton & Macke, manufacturers of improved wire nail machines, Kokomo, Ind., have the contract for a 30 ton wire nail plant, for the Imperial Steel & Wire Co., of Toronto, Canada, for the company's Collinwood plant.

The Cleveland Crane Co., Cleveland, has secured a contract for crane equipment from the New Zealand Electrical Construction Co., which is building an extensive electrioal traction system in Christchurch, New Zealand. Practically all of the other equipment will be of American manufacture. The rails and wire will be furnished by the United States Steel Corporation.

The Warwick Iron & Steel Co., Pottstown, Pa., has lately shut down one furnace in order to reline it. The furnace now running has orders for sometime ahead. It is expected that the relining of the furnace which has just gone out of blast will be finished in October.

The rail mill of the Minnequa plant of the Colorado Fuel & Iron Co. recently rolled 550 tons of steel rails in 540 minutes, by far the best record ever made by this mill and said to be the best record made by any mill of similar capacity in the United States. There was only two percent of defective rails.

The Birmingham Storage & Warehouse Co. has been organized at Gadsden, Ala. to do a general storage business, especially that of pig iron and steel. G. H. Shuler is president, E. T. Shuler, vice president and R. D. Carver, secretary and treasurer.

The Pioneer Foundry Co., La Crosse, Wis., has purchased the Bell Machine Co., which has been operating a machine shop in that city. The Pioneer Co. will for the present operate the Bell plant, at its present location, but in the near future the equipment of the Bell plant will be moved to the Pioneer Co.'s buildings, which will be rearranged and remodeled and fitted for the automobile business. It is also proposed to begin the manufacture of engines.

The first heat was taken off at the foundry of the Rock River Mfg. Co., Dixon, Ill., July 8. The plant starts under favorable conditions.

The Stimpson Computing Scale Co. will close its plant at Elkhart, Ind., Aug. 1, and immediately thereafter the machinery will be removed to Detroit and installed in the plant of the W. F. Stimpson Computing Scale Co. The plant at Elkhart is 40 x 240 ft. with a warehouse and packing room 24 x 80 ft. It will be offered for sale.

The Ellis & Lessing Steel & Iron Co. plant, Pottstown, Pa., after an almost continuous operation for nearly 20 years, will be sold Aug. 3. The proposed sale is caused by the expiration of the charter under which the company has been doing business.

The expanded metal and sheet steel locker department of the business of Merritt & Co., Philadelphia, has so increased that the two plants which the company has been operating in Camden have proved inadequate. The company has therefore purchased property at the Northwest corner of Front and Arch streets, Camden, N. J., containing more than 80,000 square feet of floor area, and will move its locker department to that building. The company's general office and structural iron department will be continued at 1024-30 Ridge avenue, Philadelphia. In addition to the lockers, the company will manufacture in Camden some of its other specialties, such as sheet steel shelving, expanded metal elevator enclosures, window guards, etc.

The Davis Foundry, Inc., of Hornellsville, N. Y., has secured the contract from the American Bridge Co. for building the iron columns for the new Sibley building in Rochester. This contract will require about 400 tons of iron to complete it.

The Semisteel Co., Cleveland, has obtained the contract for equipping a complete sand lime brick plant for the Grenada Oil Mill Co., of Grenada, Miss.

The plant of the National Lock & Metal Co., Brooklyn, N. Y., recently damaged by fire, is being rapidly repaired and manufacturing will be resumed in a week or two.

J. Frank Harbster has leased the Central Foundry, Reading, Pa., and will conduct a general foundry business.

The Brown-Corliss Engine Co., Corliss, Wis., has just opened a department for building high speed engines, and is now working on two units of 150 h. p., three 250 h. p., two 50 h. p. and one 75 h. p., all to be direct connected.

The Empire sheet mill at Niles, O., was closed for repairs last week.

Shenango Furnace Co.

The Shenango Furnace Co., Pittsburg, has awarded the contract for the erection of four new stoves at its No. 3 furnace, Sharpsville, Pa., to George W. McClure & Son, Pittsburg. The contract for the steel plate work was awarded the Sharon Boiler Co., Sharon, Pa. The stoves will be 19 x 85 feet and will replace the old style stoves now at this plant. In addition a skip hoist will be erected and a mechanical top will be put on the furnace. The furnace is still in operation, as well as No. 2, although it was the intention to blow them out earlier in the month. It is probable that when No. 3 goes out for repairs No. 1, which has been idle for some time, will be blown in. Concerning the published report that two new furnaces will be built, the company states that while it contemplates at some time erecting furnaces to replace Nos. 1 and 2, no definite plans in that direction have been made.

The organization of the Syracuse Cutlery Co., Syracuse, N. Y., has been completed by the election of the following officers: President, John Gardner, manager of the Crucible Steel Co.; vice president, Arthur Klein, of the Juengel-Klein Cutlery Co., whose business will be absorbed by the new company; secretary and treasurer, George A. Newman, of the Syracuse Chilled Plow Co., and superintendent, Fred Juengel. The company succeeds the Juengel-Klein Co., taking in new men and increasing the capital, which is now $40,000. The company will make a specialty of manufacturing high grade razors and surgical instruments. It is expected a new plant will be erected next year. Vice President Klein has started for Germany, were machinery will be purchased.

As a result of the death of Charles W. Potts, the firm of W. F. Potts, Son & Co., Philadelphia, dealers in iron, steel, tin plate and metals, has been incorporated under the same firm name. John P. Balderston, who has been connected with the business for more than 34 years, has been elected president, Joseph L. Rutter, vice president and W. K. Singleton, secretary-treasurer.

The Findlay Axe & Tool Co., of Findlay, O., has opened a New York office at 35 Warren street in order to facilitate the securing of export trade. The office is under the management of Max T. Christopher.

The annual meeting of the stockholders of the Firth-Sterling Steel Co., Pittsburg, was held last week. Officers and directors were re-elected as follows: L. J. Ferris, president; A. A. Wheelock, vice president; James E. Porter, secretary; and E. B. Clarke, treasurer and general manager. The board of directors includes these officers, together with J. Kinnear and J. H. Willock.

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But this is not the only way in which a Cochrane Heater will improve the feed water. It is simply one instance of what can be done. Would you like to know the other things? Ask us to tell you about them if you are interested.

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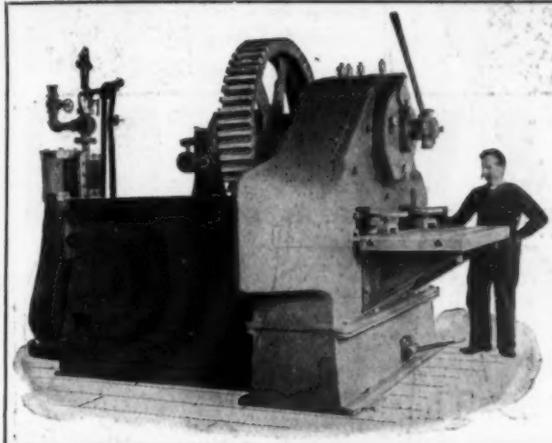
Manufacturers of Cochrane Feed Water Heaters, Cochrane Steam and Oil Separators, and the Sarge-Cochrane Systems.



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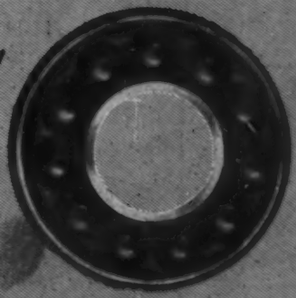

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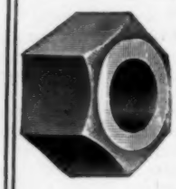

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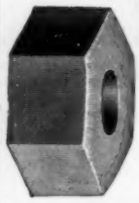

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NEW YORK:	Empire Building
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